FINAL

PHASE III SAMPLING AND ANALYSIS PLAN

Remedial Investigation
Former Camp Hero, Montauk, New York

Revision: 0

Prepared for:

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19 May 2017

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ACRONYMS AND ABBREVIATIONS

ACWS	Aircraft Control and Warning Squadron
ADR	Automated Data Review
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AOC	Area of Concern
APP	Accident Prevention Plan
ARAR	applicable or relevant and appropriate requirement
BAF	bioaccumulation factor
bgs	below ground surface
BOD	biochemical oxygen demand
BSAF	biota-sediment accumulation factor
BTV	Background Threshold Value
CAS	Chemical Abstracts Service
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
COC	chain of custody or chemical or concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CSM	conceptual site model
CWM	Chemical Warfare Materiel
CX	Center of Expertise
DEM	Digital Elevation Model
DD	Decision Document
DDESB	Department of Defense Explosives Safety
DL	detection limit
DO	dissolved oxygen
DoD	Department of Defense
DOT	Department of Transportation
DPT	Direct-Push Technology
DQI	data quality indicator
DQO	data quality objective
DU	decision unit
EB	equipment blank
ECD	electron capture device
EPA	Environmental Protection Agency

EPC	exposure point concentration
ERA	Ecological Risk Assessment
EM	Engineering Manual or Environmental and Munitions
eQAPP	electronic Quality Assurance Project Plan
FD	field duplicate
FPS	Fixed-Pulse Radar Surveillance
FPH	Fuel Pump House
FS	Feasibility Study
FT	feet
GC	gas chromatograph
GC-ECD	gas chromatograph-electron capture detector
GPS	global positioning system
HHRA	Human Health Risk Assessment
ICP	inductively coupled plasma
IDW	investigation-derived waste
ISM	incremental sampling method
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LIDAR	Light Detection and Ranging
LIF	Laser Induced Fluorescence
LNAPL	light non-aqueous phase liquid
LOD	limit of detection
LOQ	limit of quantitation
MCL	maximum contaminant level
MDL	method detection limit
MEC	munitions and explosives of concern
MNA	Monitored Natural Attenuation
MP	Motor Pool
MPC	measurement performance criteria
MS	matrix spike
MSD	matrix spike duplicate
N/A	not applicable
NFA	no further action
NOAEL	No Observed Adverse Effect Level
NRHP	National Register of Historic Places

NTU	nephelometric turbidity unit
NY	New York
NYSDEC	New York State Department of Environmental Conservation
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PDF	portable document format
PID	Photo Ionization Detector
PP	Proposed Plans
PSLs	project screening levels
PWS	Project Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RAO	remedial action objective
RI	Remedial Investigation
RL	reporting limit
RPD	relative percent difference
RSL	regional screening level
RTC	response to comment
SAP	Sampling and Analysis Plan
SC	specific conductivity
SDG	sample delivery group
SEDD	Staged Electronic Data Deliverable
SIM	Selective Ion Monitoring
SLERA	Screening Level Ecological Risk Assessment
SOP	standard operating procedure
SS	Site Supervisor
SSHO	Site Safety and Health Officer
STB	Suspected Tank B
SU	sampling unit
SVOC	semi-volatile organic compound
TB	trip blank
TBD	to be determined

TCLP	toxicity characteristic leaching procedure
TDD	Total Daily Dose
TSERAWG	Tri-Services Environmental Risk Assessment Work Group
TOC	total organic carbon
UCL	upper confidence limit
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
UU/UE	unlimited use/unrestricted exposure
UXO	unexploded ordnance
VOC	volatile organic compound
WP	Work Plan

Worksheet #1: Title and Approval Page

Document Title: Phase III Remedial Investigation Sampling and Analysis Plan, Camp Hero, Montauk, New York

Document Control Number: TBD

Lead Organization: U.S. Army Corps of Engineers (USACE), New England District (NAE)

Preparer's Name and Organizational Affiliation: Devon Chicoine, AECOM

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Preparation Date: 05/04/2017

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Mark MacEwan, Project Manager, AECOM

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Approval Signatures: ______________________________
Gregory Goepfert, USACE New York District

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Megan Cullen, USACE New England District

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Worksheet #3: Distribution List

The following individuals and their organizations require copies of the approved SAP and any subsequent revisions and other site-specific documents.

QAPP Recipients	Title	Organization	Telephone Number	Fax Number	Email Address
Gregory Goepfert	Project Manager	USACE-NY	917-790-8235	-	Gregory.J.Goepfert@usace.army.mil
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Patrick Mion	Geologist	USACE-NAE	978-318-8437	-	Patrick.J.Mion@usace.army.mil
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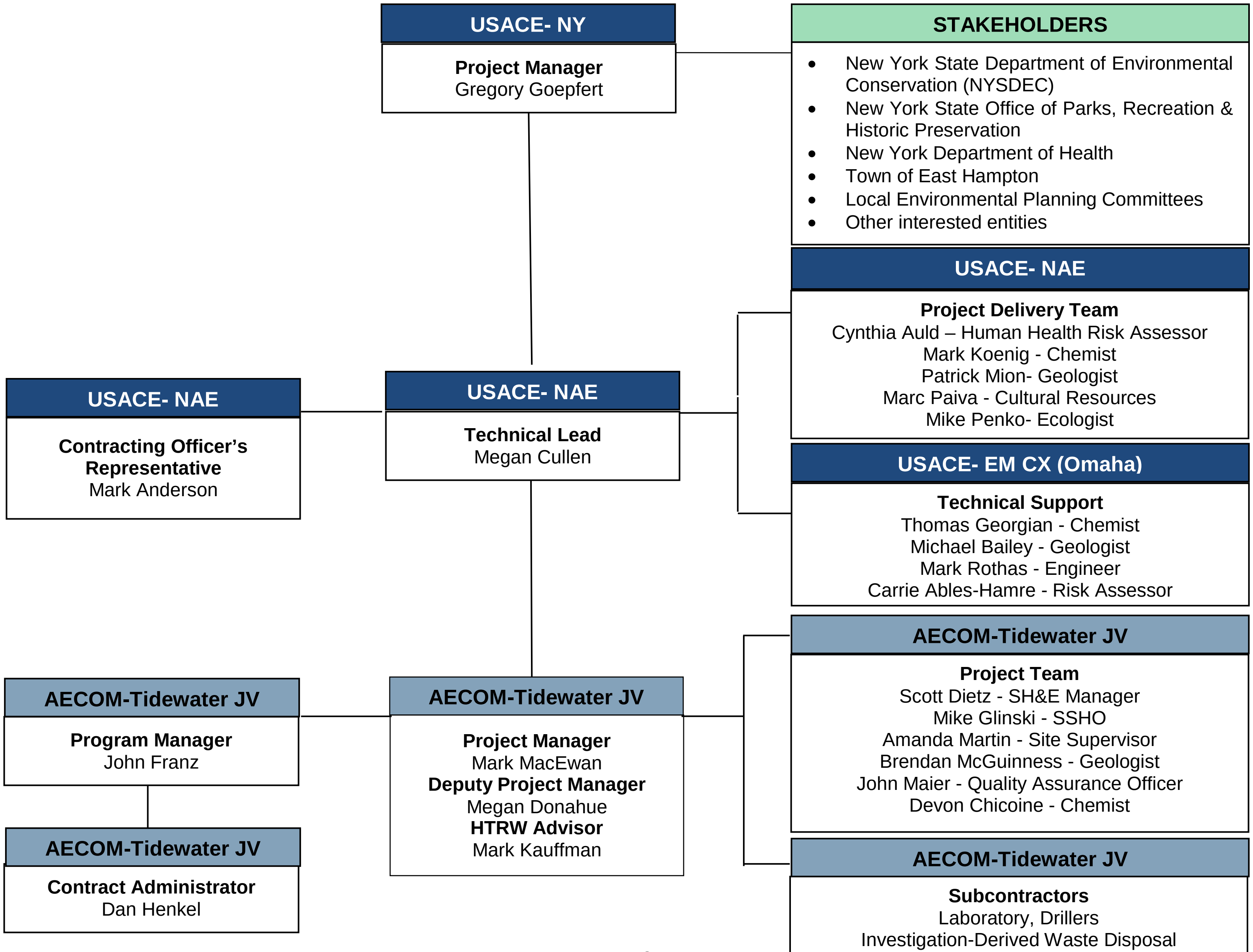
Worksheet #5: Project Organizational Chart



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Worksheet #6: Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Point of Contact with USACE	AECOM Project Manager	Mark MacEwan	703-682-9092	Reporting of project information to the USACE Project Manager through WPs, monthly progress reports, e-mail updates, teleconference calls, and meetings.
Manage All Project Phases	AECOM Project Manager AECOM Field Sampling Team Leader	Mark MacEwan Amanda Martin	703-682-9092 434-664-8047	Primary modes of communication are telephone, e-mail, letter, document submittal; timing dependent on nature of communication and predefined schedules, as applicable and as requested by agencies.
QAPP changes in the field	AECOM Field Sampling Team Leader	Amanda Martin	434-664-8047	Notify AECOM Project Manager and Project Chemist of changes to QAPP in the field and rationale for changes. Document changes in field daily progress reports and memoranda to AECOM and USACE Project Managers.
Daily Field Progress Reports	AECOM Field Sampling Team Leader	Amanda Martin	434-664-8047	Field Sampling Team Leader will complete daily field progress reports and forward to AECOM and USACE Project Managers on a weekly or as needed basis.
Field Corrective Action	AECOM Project Chemist	Devon Chicoine	703-682-9069	Need for field corrective action will be determined by the Project Chemist and will be communicated to the Field Sampling Team Leader and in memoranda to AECOM and USACE Project Managers.
Reporting Laboratory Data Quality Issues	Eurofins Laboratories Project Manager	Stephen Gordon	717-656-2300	All QA/QC issues with project field samples will be reported by the laboratory to the Project Chemist/QA Officer.
Laboratory Analytical Corrective Actions	AECOM Project Chemist Eurofins Laboratories Project Manager	Devon Chicoine Stephen Gordon	703-682-9069 717-656-2300	Need for laboratory corrective actions will be determined by the Project Chemist and/or laboratory Project Manager or QA Manager and will be documented in memoranda to AECOM and USACE Project Managers.
Data Tracking and Management	AECOM Project Chemist	Devon Chicoine	703-682-9069	Project Chemist (or delegated representative) will track data from collection of samples through login at laboratory to delivery by technical report/sample data group and electronic data delivery into database.

Worksheet #6: Communication Pathways (Continued)

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Release of Analytical Data	AECOM Project Chemist	Devon Chicoine	703-682-9069	Final analytical data cannot be released until validation is complete and Project Chemist has approved release.
QAPP Amendments	AECOM Project Chemist	Devon Chicoine	703-682-9069	Changes to the QAPP will be approved by the AECOM and USACE Project Managers.
Data Validation Issues	AECOM Data Validator	Devon Chicoine	703-682-9069	The Data Validator will coordinate with the Project Chemist and analytical laboratory to ensure data packages provided by the laboratory are complete. The Data Validator will immediately notify the Project Chemist of data that are qualified as rejected, or R-flagged.
Human Health Risk Assessment	AECOM Human Health Risk Assessor	Gretchen Welsholfer	301-820-3148	The Risk Assessor will coordinate with the Project Chemist, database manager, and statistician to complete risk assessment.
Ecological Risk Assessment	AECOM Ecological Risk Assessor(s)	Jeff Briggs Christine Archer	518-951-2280 603-622-1556	The Risk Assessor will coordinate with the Project Chemist, database manager, and statistician to complete risk assessment.

Worksheet #9-1: Project Scoping Session Participants Sheet

Project Name: Phase III Remedial Investigation
Projected Date(s) of Sampling: mid-2017
Project Manager (Contractor): Mark MacEwan
Date of Session: February 23, 2017
Location of Session: USACE New England District, Concord, MA
Scoping Session Purpose: Technical Project Planning (TPP) Session

Site Name: Camp Hero
Site Location: Montauk, New York

Name	Title	Affiliation	Phone #	E–Mail Address	Project Role
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Jeff Briggs	Risk Assessor	AECOM	D 518-951-2280	Jeff.Briggs@aecom.com	Ecological Risk Assessor

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The following bullets summarize the significant topics that were discussed and decisions made during the TPP session that contribute to the Phase III RI SAP.

CERCLA Process

- The team concurred to designate areas of concern (AOCs) that warrant no further action (NFA) by comparing the available dataset collected to date to preliminary screening criteria and background threshold values (BTVs). The team agreed to present the outcome of that screening process as an appendix to the Phase III remedial investigation (RI) field investigation Sampling and Analysis Plan (SAP), to document and support which AOCs will be further investigated as part of the Phase III RI field investigation. The team also agreed to include that same appendix in forthcoming Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documents as required, such as the RI report after the Phase III RI is completed. The team agreed not to prepare a separate "Site Inspection" document at this point in the CERCLA process.

- The team agreed to consider two separate Proposed Plans (PPs) and Decision Documents (DDs), one for the AOCs recommended for NFA and the other for those AOCs that warrant further action. The team agreed to consider presenting the PPs for both categories simultaneously to be efficient with public outreach and hearings, as well as to be efficient in securing the DD signatures. The basis for two separate DDs is to minimize the 5-year review requirements to only the DD that includes AOCs that warrant further action.

- The team agreed to use a streamlined Tier II Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP) format for the Phase III RI SAP, rather than prepare multiple project work plans.

- The team will streamline the SAP document refinement process by: (1) submitting UFP-QAPP Worksheets 10, 11, and 17 to the USACE New England, New York, and Environmental and Munitions (EM) Center of Expertise (CX) in advance of the SAP, (2) reviewing USACE comments together during a working TPP session scheduled for 13 April 2017, rather than preparing response to comments (RTCs), and (3) refining the document together to expedite document finalization and ensuring on-schedule field mobilization.

- The team agreed to expedite the SAP process and set a team goal to mobilize for the field program in June 2017 with an objective to demobilize prior to the July 4th weekend.

Grouping of AOCs and Selection of Decision Units (DUs)

- The team agreed with the concept to group contiguous AOCs to create larger DUs that have a more robust dataset and are more representative of potential human health and ecological exposures.

- AOCs will be grouped into DUs that are approximately ½ acre (or up to 1 acre if feasible). The DUs may be subdivided into sampling units (SUs) if necessary based on variations within the DUs, such as areas where light non-aqueous phase liquid (LNAPL) is present. In general, the DUs will be geometric squares, but may be adjusted slightly in some locations to account for nearby fences, roads, steep slopes, drainage channels, or similarly significant geographic features.

- Unbiased samples will be collected from within the DU to obtain a sufficient dataset for statistical calculations (a minimum of 15 points) and to calculate representative exposure point concentrations (EPCs) for use in risk assessments.

- The team agreed that DUs should be contiguous. A DU cannot include multiple, geographically separate areas even if they have similar sources/impacts, because that would not be representative of an exposure area.

- Samples will not be collected from inaccessible areas within each of the DUs; however, the entire DU boundary will still be considered the "exposure area" for quantification of potential risks to receptors. The basis for this decision is that if areas within the DU are inaccessible for sampling, then they would generally provide limited accessibility to potential receptors.

Preliminary Screening Evaluation

- The team agreed to revisit relevant preliminary screening criteria to ensure that it would include a conservative assumption of residential use and include both Environmental Protection Agency (EPA) and New York State Department of Environmental Conservation (NYSDEC) criteria.

- Other considerations would include ecological screening criteria for the representative receptors given the generally dry conditions of the majority of intermittent drainage channels.

- As part of the preliminary screening evaluation of the existing dataset, the maximum concentration for each analyte will be compared against the residential screening criteria and BTVs. This is acceptable on a per-AOC basis because the dataset is small (less than 20 samples) for each parameter.

- If the result is below the screening criteria and/or BTV, it will not be retained as a parameter of concern. If no analytes exceed the conservative screening criteria or BTV, then NFA will be warranted for that particular AOC.

- The team discussed applying a comparison of mean values as a statistical approach, considering a two-tailed hypothesis test, and the logistics of obtaining and applying uncensored analytical data. The team concurred that with the limited dataset, such as for groundwater (in many cases less than 3 samples), site concentrations will be compared with BTVs during the data analysis phase of the RI.

- The team reiterated that this preliminary screening step is very conservative, and the screening criteria selected will not necessarily be the same criteria used to define project screening levels (PSLs) in the Phase III RI SAP, will not necessarily be the same criteria and/or exposure scenarios used in the human health and ecological risk assessments, and will not necessarily be the same criteria applied in the feasibility study to define applicable or relevant and appropriate requirements (ARARs) and develop project-specific remedial action objectives (RAOs). This is a critical team concept to document and apply throughout the CERCLA process.

- The team concurred to build in the delivery of uncensored analytical data as part of the forthcoming Phase III RI field investigation in the event that it could be used for statistical evaluation as part of the RI report.

<u>Risk Assessment Scenarios and Pathways</u>

- The team discussed relevant exposure scenarios and screening criteria, relative to groundwater potability, the recently updated EPA polycyclic aromatic hydrocarbon (PAH) toxicity values, and an evaluation of the most conservative, but realistic, future scenarios for this project. The current and future land use scenarios and pathways to be considered will be presented in the SAP for team review and concurrence, and then applied to the risk assessments that will be part of the RI report. These exposures are expected to be different (most likely less conservative) than those being used for the preliminary screening evaluation.

- The future use human health receptor scenarios and pathways will be finalized after the Land Use Letter is submitted by New York State Park personnel, and it can be considered in determining the most conservative, but realistic, potential future use scenarios. The team acknowledged that it is possible that a small parcel within the investigation area may be designated for residential use. If so, the team may consider evaluating the future use residential scenario for DUs (if any) that are within that designation.

Background Samples and Comparison

- The team acknowledged the need for permanent, developed monitoring well network within the Camp Hero investigation area for groundwater sample collection via low-flow methods to compare with groundwater BTVs. The existing groundwater data (with the exception of Building 203) was collected via well points, exhibited a high level of turbidity and suspended solids, and thus is not suitable for comparison to BTVs for formation groundwater. The existing groundwater data is useful, however, for refining the conceptual site model (CSM) relative to potential groundwater impacts, identifying parameters of concern, and assisting in placement of the permanent monitoring well network that will be installed during the Phase III RI field investigation.

- The team acknowledged that the results of PAHs and polychlorinated biphenyls (PCBs) in the well point groundwater data is another indication that suspended solids are present and contributing to the analytical results, rather than representing the potential potable groundwater condition of the formation.

- The team agreed that the statistical approach to background comparisons after the Phase III RI field investigation will be more robust than the discrete-based approach used in the preliminary screening evolution. The team also acknowledged that per CERCLA guidance, the next background screen will be conducted as part of the uncertainty evaluation to support risk-based decisions after the human health and ecological risk assessments are completed.

Surface and Subsurface Soil Samples

- The team agreed to collect surface soil samples from a depth of 0 to1 foot (ft) below ground surface (bgs), and subsurface soil samples from a composited depth of 1 to10 ft bgs. If discrete samples area analyzed, rather than incremental sampling method (ISM) samples, total soil (0 to10 ft bgs) results could be derived if needed during the RI or feasibility study (FS) phase. The concept was that exposure to subsurface soil would be across the 1 to 10 ft bgs depth horizon; therefore, a composite samples collected from that horizon at each sample location would be most representative for assessment of potential risks.

- Subsurface soil will also be evaluated as part of individual DUs, not as a sitewide DU.

- The analyses will vary for each DU, and will be limited to those analytes that exceeded the preliminary screening evaluation.

- The approach to establishing sampling grids for surface soil will consist of applying a ISM or collecting a minimum of 15 discrete samples from each of the DUs. The team concurred to research which of those sample collection methods would be best suitable for the site conditions expected, as well as the costs for sample collection, processing, and laboratory analysis. An additional factor the team discussed was ensuring that analytical data is comparable to BTVs. The team noted that because the BTVs were calculated using discrete samples, the team may need to collect discrete samples rather than ISM sampling for continued comparison to BTVs.

- The team concurred that the soil dataset available to date was intended to identify source areas, not to establish EPCs for larger exposure areas. Thus, the team will use the existing dataset for defining DU boundaries and selecting parameters of concern, but will not include existing biased data in calculating EPCs at the completion of the Phase III RI field investigation. The EPC calculations will be limited to only those samples collected from the unbiased grid to be designed within each of the DUs.

Surface Water and Sediment Samples

- Surface water and sediment samples will be collected from drainage channels that are adjacent and downgradient of DUs with the potential for surface water and sediment impacts. Similar to surface and subsurface soil, unbiased samples will be collected from the drainage channels to obtain a sufficient dataset for statistical calculations (a minimum of 15 points) and to calculate representative EPCs for use in risk assessments.

- Surface water and sediment samples will be analyzed for the same parameters that will be analyzed in soil, subsurface soil, and/or groundwater associated with the associated DUs being investigated.

- Background/reference surface water and sediment samples will consist of a minimum of 15 upstream samples collected on a sitewide basis. This includes both steam type (revetted and non-revetted) to the extent possible given the relative precipitation since these streams are mostly intermittent. The team recognized that if there are insufficient reference locations for background sample collection, local upstream sediment and surface water conditions local to each relevant DU would be used to support the individual CSMs.

- The team acknowledged that there are insufficient aquatic ecological receptors in the surface water given the generally dry conditions of the drainage channels. However, surface water data is still necessary to support potential human health risk assessment exposures that include wading or other types of surface water contact or incidental ingestion pathways.

Groundwater Samples

- A network of wells across the site will be installed to build a representative groundwater monitoring well network. In addition, DU-specific wells will be installed, as required, for those DUs with demonstrated or potential groundwater impacts (such as Building 203).

- The selection of monitoring well locations will be biased to establish sufficient data points for refining the CSM. Groundwater is considered to be spatially correlated, which allows this biased approach. This is different from the soil sampling concepts discussed earlier, because soil is not spatially correlated.

- The team agreed to avoid drilling through the clay layer during this RI program. There is insufficient data to justify penetrating the clay layer and risking the potential downward spreading of site impacts. This decision could impact the availability of suitable monitoring well locations, given that there will be portions of the site where groundwater will not be encountered above the clay layer.

- The analyses will include parameters that were previously detected above screening values and BTVs, as well as mercury (which was not included in prior groundwater sampling events), and select monitored natural attenuation (MNA) and geochemical parameters. The team's intent is to provide sufficient groundwater data to assess risks, support the FS evaluation of remedial alternatives, and focus the remaining CERCLA process on those areas that warrant further consideration relative to groundwater quality.

- The team will evaluate whether groundwater at the site is potable. The team discussed the possibility of saline conditions, insufficient yields, and potential lack of connection to the lower productive aquifer as possible reasons to render groundwater as non-potable at the site. The team agreed that the drinking water pathway is appropriate for the preliminary screening evaluation, but may not be appropriate for the current or future use scenarios and pathways to be applied in the forthcoming human health risk assessment after the collection of Phase III RI data.

- The team agreed to review the available data collected to date for the mobility of LNAPL and to include measurements and parameters as needed during the Phase III RI field investigation to provide sufficient information for the evaluation of LNAPL remedial options in the FS. References to review include Interstate Technology and Regulatory Council and American Society for Testing and Materials guidance.

- The team acknowledged that there may be difficulty obtaining true formation groundwater if well construction, development, and low-flow sampling does not yield groundwater with < 10

NTU turbidity. The team will conduct field-filtering for non-volatile organic parameters [such as Semi-Volatile Organic Compound (SVOCs) and PCBs) and metals, if collected. It is not appropriate to field-filter samples for Volatile Organic Compound (VOCs).

Potential Acetone Impacts in Soil

- The team agreed that there was a low probability that acetone was still present even though there were acetone detections from the Phase I RI. The age of the potential releases are long ago and acetone is one of the more volatile organic compounds. The team acknowledged that if acetone is present in surface soil in particular, its presence is even more questionable. The team agreed to revisit screening criteria (as described above) and to conduct a more thorough evaluation of the reported acetone concentrations relative to the screening criteria, as well as to further explore the conditions in which acetone was reported, such as soil type, depth, and field measurements.

- If re-evaluation of the screening criteria does not eliminate acetone as a parameter of concern, the team discussed the potential option of field verification of acetone by collecting biased confirmatory samples.

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Worksheet #9-2: Project Scoping Session Participants Sheet

Project Name: Phase III Remedial Investigation
Projected Date(s) of Sampling: mid-2017
Project Manager (Contractor): Mark MacEwan
Date of Session: 13 April 2017
Location of Session: USACE New England District, Concord, MA
Scoping Session Purpose: Technical Project Planning (TPP) Session

Site Name: Camp Hero
Site Location: Montauk, New York

Name	Title	Affiliation	Phone #	E–Mail Address	Project Role
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The following bullets summarize the significant topics that were discussed and decisions made during the TPP session that contribute to the Phase III RI SAP.

Preliminary Screening Evaluation

- The team concurred that it was accurate to have separate screening criteria for non-petroleum impacted AOCs vs. petroleum impacted AOCs. The team noted that there are some parameters on the NYSDEC STARs list that are not on the other HHRA or ERA criteria lists. There are also lower values in some cases for parameters on the STARs list. The team concurred to organize the criteria tables more clearly to sort parameters by parameter group for easier review. The team also concurred to simplify Tables 3 and 5 to show only those parameters that have NYSDEC STARs criteria, since all other parameters with HHRA and ERA screening criteria are shown in Tables 1, 2, and 4.

Risk Assessment Approach

- For the discussion of groundwater potability and the discussion of future site use, reference the recent figures received from Brian X. Foley, Deputy Regional Director, Long Island State Parks Region on April 3, 2017. Clarify that there are no plans for future residential use. This applies to both soil and groundwater. This will be added to Worksheet #10
- Correct the definition of UU/UE to "unlimited use/unrestricted exposure."
- For discussions of the CERCLA "hypothetical" future use scenario relative to groundwater being used as a drinking water source, clarify that the project team completed a groundwater potability analysis to support the selection of potential exposure pathways, as well as subsequent risk-based decision throughout the CERCLA process (refer to Appendix G). The analysis revealed that the shallow perched groundwater at Camp Hero is not suitable as a potable water source. However, the drinking water exposure pathway will be assessed as a potential use, however unlikely, in the HHRA to assess the potential unlimited use/unrestricted exposure (UU/UE).
- Use the meadow vole instead of muskrat in the ERA, as it is expected to be a better habitat match for the Camp Hero site.
- The team agreed to host a separate call with the risk assessors and other involved team members to discuss details of the HHRA and ERA approaches including exposure assumptions, BTV comparisons, background population comparisons, and calculations of EPCs.

Analytical Parameters

- The team agreed to consider eliminating SVOCs other than PAHs from laboratory analysis at DUs where no other SVOCs exceeded the preliminary screening evaluation, except at DUs with potential petroleum impacts where the NYSDEC STARs list SVOCs would be required. The team would evaluate which DUs would potentially apply to this protocol. However, in considering the logistical details of this suggested change, the AECOM team is recommending to keep the same SVOC/PAH parameter list for all DUs. The team chemist confirmed that all SVOCs (including PAHs) will be analyzed by the same initial method (SW846 Method 8270), after which PAHs will be subsequently re-analyzed by SIM only if the detections are in the vicinity of the LOD or not detected. In addition, if there were different parameters within parameter groups at certain DUs, there would be a different eQAPP required in ADR to assess the data. There would be different COCs required, different SDGs, increased data management, and a higher potential for error.

Background Data and Comparisons

- The team clarified the use of BTVs and the background dataset, and the sequence of background screening relative to the risk assessments for soil, sediment, and surface water media as recommended by the CX is as follows:
  - Step 1: Compare Phase I and II data to BTVs as a preliminary screening evaluation to identify DUs and chemicals requiring analysis in Phase III (this step has been completed; refer to Phase III RI SAP Appendix E).
  - Step 2: Compare Phase III data to human health and ecological screening values and BTVs as the first step in the risk assessments.
  - Step 3: If Phase III data is in exceedance of BTVs, conduct a statistical population comparison of the DU (or exposure area for surface water and sediment) dataset to the background dataset (referred to by some as a "means" comparison).
  - Step 4: If Phase III DU or exposure area data is in exceedance of the background data and screening values, then the chemical is identified as a chemical of potential concern (COPC) and EPCs are calculated to conduct the HHRA and ERA for that DU or exposure area.
- This approach is generally consistent with DoD guidance (2011 Tri-Service Position Paper on Background Levels in Risk Assessment) which considers background conditions early in the evaluation to focus the risk assessments on potentially site-related COPCs. However, the approach agreed to by the team considers background conditions earlier in the ERA process than is recommended in the 2011 DoD guidance. It is recognized that for CERCLA sites, background conditions are typically used in the ERA to refine COPCs in Step 3a (USEPA,

2001), rather than in the upfront selection of COPCs, and that the background evaluation is typically conducted at the end of the HHRA (USEPA, 2002a). The team agrees with the CX recommendation to include background prior to the selection of COPCs as part of the sequential evaluation of the DUs and exposure areas in order to focus on potentially site-related COPCs.

- The team clarified that groundwater data from each well will be individually compared with the groundwater BTVs and human health screening levels to identify COPCs. Each well will be evaluated separately in the HHRA.
- For the preliminary screening evaluation, the lowest BTV was used when two values were generated for the two different soil types. There was non-concurrence from the EM CX that the smallest BTVs should be used. The EM CX recommendation was to compare the data sets properly prior to pooling them and recalculate the BTVs (using the new pooled data sets), or use the largest BTVs to minimize false positives. Upon discussion, the team decision was to use lowest of the two BTVs in preliminary screening as a conservative screening step. However, the team may consider applying the higher BTV during the subsequent background evaluation steps (refer to stepwise approach above) to minimize false positives in the risk evaluations.
- The team discussed the sampling of wetlands and whether a wetland soil background dataset is required. The team agreed that a separate wetland soil background dataset was not warranted due to the limited DUs that contain wetland soil. Additionally, the wetlands within DUs will be sampled from 0 to1 and 1 to 2 feet, and the data would be compared to both soil and sediment BTVs and relevant HHRA and ERA criteria. The team may consider collecting wetland soil background data in the future if the comparison to the soil and sediment BTVs are determined to be non-representative of wetland conditions.
- The team discussed potentially collecting a second round of groundwater samples from the background wells to increase the background groundwater dataset. Chemical testing of groundwater samples from the background wells was also recommended by the EM CX to determine whether results are consistent with the current set of BTVs (i.e., as a check that verifies the metal concentrations are less than the current calculated BTVs). However, the team decision was that it was not necessary at this time because the first round of samples yielded a background groundwater dataset that was generally normally distributed and representative of background conditions.
- The team agreed to include the background monitoring wells in the Phase III field program groundwater gauging event to support the groundwater flow evaluation and mapping.

Surface and Subsurface Soil Evaluation

- The team concurred that either ISM or discrete sampling could be considered for this site and phase of work. The team will still implement discrete sampling, but will revise the text to indicate that ISM could have been used as well. The team will refine the basis for this decision in Worksheet #17.
- The team agreed that surface soil samples will be collected for the same parameters as subsurface soil where subsurface soil samples are collected, to allow for the calculation of total soil values as needed for some of the HHRA exposure scenarios. Subsurface soil samples will not be collected at DUs where the Preliminary Screening Evaluation (refer to Appendix E) indicates that subsurface soil warrants no further action. Additionally, surface soil samples will not be collected during the Phase III effort at Building 203 because an unbiased grid of surface soil samples was already collected during Phase II calculation of EPCs and use in the HHRA (including total soil evaluations).
- Clarify in the text and figures the rationale for designing the DU boundaries. It appears that some of the DUs are not centered on the source areas. Specific examples noted during the meeting were DU02, DU04, and DU14. The text and figures will be clarified to present the potential source area being evaluated and site features that contributed to selecting the DU boundaries (such as nearby fence, drainage channel, steep slope, etc.), resulting in some DUs not being centered on the source areas.
- The team agreed to use 16-point grids for all DUs (whether 0.5 or 1 acre), rather than using an increased number of points for the larger DUs.
- If areas within a DU are inaccessible for the intended sampling design (such as shallower depths due to wet conditions or refusal), the subsurface sampling location can be terminated at the shallower depth and still be incorporated into the subsurface soil dataset for that DU. Similarly, if a steep slope prevents access by a drilling rig, the team can offset that location to an accessible area within the DU (in an unbiased fashion) or use hand-augering to collect subsurface soil to the depth possible. In general, the team expects that the maximum depth of hand-augering will be in the range of 2 to 4 feet.

Groundwater

- The team clarified that there is not a need to differentiate between the East and West Basin. The background groundwater evaluation revealed similar groundwater conditions across both of the basins. The text will be revised to remove implied rationale to differentiate groundwater collected from each of the basins.

- The team agreed to increase the specificity of groundwater well placement rationale to Table 17-4. The specific DU(s) in the vicinity of each proposed well will be listed in the rationale table.

Surface Water and Sediment

- The team agreed to clarify the rationale for surface water and sampling locations. The surface water and sediment exposure areas are intended to be upstream, adjacent, and/or downstream of groups of soil DUs, and are intended for assessment of potential DU contributions, as well as broader drainage channel conditions along longer stretches of the channels. The grouping of datasets into exposure areas may consider factors such as the analytical results, physical characteristics of the drainage channel sediment, surface water conditions at the time of sampling (i.e., wet or dry), and proximity to nearby DUs. Separate EPCs will be generated for each exposure area.
- The team agreed to increase the number of surface water and sediment samples to a minimum of 15 in all exposure areas.

Analytical Details

- The team discussed the analysis of hexavalent chromium and concurred with analyzing 10% of the samples. The team agreed that it is acceptable to pre-select a generally well-distributed set of locations intended for this additional analysis. The team will refine the text that the analysis of hexavalent chromium is intended to verify the absence of hexavalent chromium. The New York District offered to provide a study of hexavalent chromium by Cornell University to consider as the analytical results arrive.
- The team agreed to use the hexavalent chromium data (if detected in any of the locations) to generate ratios of hexavalent to total chromium for the remainder of the dataset where hexavalent chrome was not analyzed. The ratios can then be used in the HHRA and ERA, rather than defaulting to the conservative presumption that all chromium could be hexavalent chromium.
- The team agreed that Dissolved Oxygen (DO) was missing from the list of low-flow field parameters for groundwater sampling, and it will be included in the draft SAP.
- The team discussed the necessity of collecting Matrix Spike Duplicate (MSD) samples or Field Duplicate (FD) samples. The EM CX recommended matrix spike duplicates and field duplicates not be collected for the soil DUs, as n = 15 – 20 independent replicates are planned. The variance of these replicates will measure total precision. Owing to the small sample size (n = 2) and the lack of statistical independence for the subject duplicates, they will be of little or no value for characterizing total precision, which they will likely underestimate. However, the

team decision was to not eliminate MSD and FD samples because they are required by the project chemist to comply with the DoD QSM data validation requirements.

- The team followed-up on the assessment of acetone. After the updated preliminary screening evaluation, it was apparent that acetone was well below the screening criteria. The team also noted that because acetone was reported in surface soil, given the volatility of acetone and timeframe since a possible release could have occurred, it is unlikely that acetone is actually present at the site.

Workflow and Schedule

- The team agreed that because preliminary worksheets (Worksheets 10, 11, and 17) were reviewed by USACE, and informal comments were presented for team discussion, no "formal" comments or response-to-comments (RTCs) are required prior to USACE review of the full draft SAP. The team expects the full draft SAP to be provided by April 20th, with an expedited USACE review by April 27th. The team expects formal comments, formal responses, and a subsequent "final" SAP to position the team for presentation of the SAP to stakeholders in mid-May, field mobilization by early June, and field completion by the end of June.
- The team agreed to review prior comments from the NYSDEC and NYSDOH to anticipate the types of input they may offer in reviewing the Phase III RI SAP. The team will pre-emptively address that input to the extent possible. Upon further review, NYSDEC input was provided on May 26, 2016 relative to the Phase I RI Work Plan, and included NYSDOH input. Two of the following five items were identified and have already been addressed. The Phase III RI SAP also incorporates these items:
  - (NYSDEC) Contaminant migration relative to soil vapor. The Phase III RI SAP incorporates potential vapor migration as part of the HHRA exposure pathways presented in Tables 10-1 and 10-2.
  - (NYSDEC) Depth of subsurface soil sampling. The depth of subsurface soil sampling will be 1 to 10 feet, or 1 to 2 feet in wetland areas (per earlier team discussion during this TPP discussion). This detail is provided in the Phase III RI SAP Worksheet #17 and the associated rationale tables.
  - (NYSDEC) Expanded list of VOCs for the Motor Pool. The list of VOCs for the Motor Pool will consist of all VOCs on the NYSDEC STARs list for petroleum-related investigations. This detail is provided in the Phase III RI SAP Worksheet #15, as well as Worksheet #17 and the associated rationale tables.

- (NYSDOH) Modification to the Community Air Monitoring Plan (CAMP). The CAMP was previously modified to incorporate NYSDOH requirements and is provided as Appendix H to the Phase III RI SAP.
- (NYSDOH) Incorporation of NYSDOH screening criteria for groundwater. As part of the HHRA process, groundwater results from the Phase III RI field effort will be compared to relevant screening criteria (which will include NYSDOH screening criteria), as well to the background groundwater BTVs.

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Worksheet #10: Conceptual Site Model

10.1 Overview

This worksheet presents general background information and working CSMs of environmental study areas, referred to as DUs, within Camp Hero. The CSMs are intended to provide the basis for developing the sampling and analysis program to complete the RI phase of the CERCLA process.

10.2 Description and Current Use

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, New York, approximately five miles east of the Village of Montauk (Figure 10-1). The park consists of 469 acres and is bound by Montauk Highway (Route 27) to the north, the Atlantic Ocean to the south, Montauk Point State Park to the east, and Camp Hero State Park's undeveloped sanctuary area to the west. The landscape includes wooded areas, freshwater wetlands, and sea-side bluffs (Figure 10-2).

Camp Hero State Park is owned by the New York State Office of Parks, Recreation, and Historic Preservation and is operating as the public recreational area (USACE 2003). The park contains hiking trails and roadways leading to former military buildings, picnic areas, and recreational areas. Although the Fixed-Pulse Radar Surveillance (FPS)-35 Radar Tower and Antenna ("Radar Tower") was listed under the National Register of Historic Places (NRHP) in 2002, only two facilities on the park are active at this time: a vehicle maintenance shop used by the New York State Office of Parks, Recreation, and Historic Preservation, and a New York State Park Police building utilized as a residence for a park officer. The developed portion of the site is fenced and the inactive buildings and bunkers have been sealed; however, some portions of these areas may be accessible to trespassers.

10.3 Topography and Geology

Montauk Point is at the eastern extremity of the Ronkonkoma moraine, which forms a ridge of coalescing hills traversing Long Island from west to east. The land surface is characterized by knob-and-kettle topography and ranges in elevation from sea level to about 100 ft above sea level, with steep terrain and thickly wooded areas throughout the park. Along the south shore, steep bluffs rise abruptly from 30 to 80 ft above narrow, rock-strewn beaches.

The Montauk Point area is underlain by crystalline bedrock of Pre-Cambrian age upon which rest, in succession, un-consolidated deposits of Cretaceous, Pleistocene, and Recent age. The bedrock likely consists of gneiss and schist and is about 1,000 to 1,300 ft below sea level. The Pleistocene deposits of Long Island are end products of the advance and retreat of several glaciers during the Pleistocene Epoch. Most of the material carried from the glacier was sand and well-rounded gravel, which was redeposited as stratified sand and gravel glacial till deposits, which make up the substratum of most of the soil in Suffolk County. Upon further retreat of the ice, most of the till and parts of the outwash and morainic deposits were covered by water or wind-deposited silt, clay, and fine sand to varying depths, resulting in lenses and beds of silt and clay. These deposits comprise the upper soil found at Camp Hero.

10.4 Hydrology and Hydrogeology

Surface water features in the Montauk Point area include lakes, ponds, streams, and small marsh areas, many of which occupy kettle holes formed by retreating glaciers. The major lakes in the Montauk area include Fresh Pond, Fort Pond, Big Reed Pond, Little Reed Pond, and Lake Montauk. Oyster Pond is the closest lake, located approximately 1,200 ft northwest of Camp Hero (USGS 1986).

Surface runoff at Camp Hero is primarily through four small un-named streams. Three of the streams flow northwestward to Oyster Pond; the fourth flows southward to the Atlantic Ocean. Much of the area precipitation runs off in temporary channels and in gullies to the Atlantic Ocean, to Block Island Sound, and into kettle holes. Intermittent streams form in the channels and gullies after rain events. Many of the primary and intermittent streams throughout the park are channelized with narrow, wooden stream revetments along the sides of the stream beds, which appear to have been installed to control surface water flow across the facility.

Groundwater is contained in the upper 200 ft of deposits, which are broadly divided into an upper unit of undifferentiated till and stratified drift and a lower unit of stratified drift. Groundwater is obtained primarily from the principal aquifer in the lower unit of stratified drift. The principal aquifer is a lens shaped body, which lies above saline water. The fresh water in the principal aquifer is under artesian pressure and has a head ranging from about sea level to 3.5 ft above sea level.

Scattered perched water bodies are found above the principal water table, owing to lenses and beds of silt and clay, which retard downward movement of water. The perched water bodies are generally small isolated bodies of water temporarily stored above the principal aquifer in scattered lenses of permeable material underlain by clay and silt (USGS 1960). During the drilling of previous monitoring and observation wells at Camp Hero, perched groundwater was reported at depths ranging from approximately 5 to 25 ft bgs. Groundwater elevations measured in June 2016 during the Phase I field effort, in conjunction the 2014 Light Detection and Ranging (LIDAR)-derived Digital Elevation Model (DEM) surface (NAVD88 vertical datum), were utilized to establish a sitewide perched groundwater elevation map. Perched groundwater flow direction appears to be within two basins in the park, the "East Basin" and the "West Basin," with a North-to-South groundwater divide splitting the park. Perched groundwater flow within the "East Basin" is to the south, while flow in the "West Basin" is to the northwest.

A groundwater potability analysis was completed as part of this RI to assess whether perched groundwater at Camp Hero should be considered a potential potable water supply. The results of this analysis indicate that the shallow perched groundwater at Camp Hero is not suitable as a potable water source and should be considered unsuitable for drinking based on the groundwater characteristics and local drinking water standards. The potability analysis is provided in Appendix G.

10.5 Operational History and Environmental Areas of Concern

Camp Hero was established in early 1942 as a Coastal Defense Installation and continued to be used for military purposes throughout the Cold War period. Military development included a series of underground bunkers associated with the many gun batteries that were used as part of a coastal defense system installed during World War II. Other developments on the site included supporting facilities (barracks, mess halls, hospital facilities, a motor repair shop, a recreation facility, sentry boxes, and water supply and sewage facilities) and a radar tower that was the main component of an air defense system in operation during the Cold War.

In 1952, the Air Force property was renamed the Montauk Air Force Station and was occupied by the Aircraft Control and Warning Squadron (ACWS). In 1974, when some of the on-site military uses were still active, portions of the property were transferred from Department of Defense (DOD) to the State of New York. With the departure of the last military personnel from the site in 1980, the DOD declared the remainder of the property to be surplus Federal land. Over the next few years the property was divided and deeded to the State of New York and Town of East Hampton. The ACWS facility was permanently closed in 1982 and the final land transfer to the State occurred in 1984.

A historical records review was conducted as part of this RI which identified 47 Areas of Concern (AOCs) at Camp Hero. The AOCs included former waste disposal areas, former coal storage areas, abandoned drum locations, possible and former underground storage tanks (USTs), former aboveground storage tanks (ASTs), and a Motor Pool building, among others. The AOCs included in the Phase I RI field investigation are shown on Figure 10-3.

10.6 Previous Site Investigations and Available Dataset

Previous investigations at Camp Hero have included UST and AST closures and reports, focused site assessments, and sitewide surveys and reports. Key reports that provide historical data for Camp Hero are briefly summarized below.

- *UST and AST Closure Reports.* With the exception of four USTs and ASTs (and one drum area) that are currently listed as in use at Camp Hero by Suffolk County OPS, all the USTs and ASTs have been removed at Camp Hero. All USTs and ASTs with reported petroleum releases and respective NYSDEC spill case numbers have a case closed status with NYSDEC. Analytical data from the closure reports at USTs 30 and 34 indicated that lead was present at concentrations that exceed screening criteria and further characterization is required.

- *Building 203 Site Assessment Report (1994).* The 1994 Site Assessment Report documents the excavation of former diesel USTs 16 and 18 at former Building 203, where 2,500 yards of diesel-impacted soil were removed. Geoprobe® borings were conducted around and within excavation and confirmatory soil and groundwater samples were collected. The results of the soil and groundwater samples were below screening criteria (USACE 1994). The Spill Report Case was closed by the NYSDEC in July 1995.
- *Hazardous Materials Survey and Preliminary Report (1998).* The 1998 Camp Hero Feasibility Study, Hazardous Materials Survey, Preliminary Report Identified areas needing further investigation but did not collect any analytical samples, with the exception of one PCB sample collected in an area of oil staining under electrical equipment in Battery 113 (Cashin Associates 1998).
- *Data Collection Report (2000).* The 2000 Data Collection Report investigated potential soil and water contamination within select areas at Camp Hero on a sitewide basis in support of a decision regarding whether further environmental action was required. Concrete chip samples, soil (surface and subsurface), groundwater and sediment samples were collected and compared against applicable regulatory criteria or guidelines (Weston, Inc. 2000). Conclusions from the investigation included:
  - The oil stains on the concrete floors of Building 107 and the Radar Tower (Building 201) contained concentrations of PCBs that exceed the TSCA unrestricted use limit of 1 mg/kg; however, the oil stains provided no significant ecological or human health threats via migration.
  - PCBs were detected in one surface soil sample above criteria near the radar tower, but no PCBs were detected above the regulatory criteria in adjacent samples collected within 50 ft.
  - Subsurface soil samples at H-11 (former Power Plant) indicated elevated levels of beryllium. Groundwater samples at H-11 indicated elevated levels of chromium and lead.
- *Phase I RI Field Investigation (AECOM-Tidewater JV 2017a).* The Camp Hero RI established 47 AOCs, based on records review and previous investigations. The Phase I RI field investigation was conducted to determine the presence or absence of contamination at the AOCs, to establish which AOCs needed additional investigation. Phase I activities included a geospatial survey utilizing archived aerial photography, digital geophysical mapping of select AOCs, and collection of surface soil, subsurface soil, and grab (unfiltered) groundwater samples. The Phase I RI field investigation activities are documented in the Phase I Field Investigation

Report (AECOM-Tidewater JV, 2016), which provides the laboratory analytical data reports from the Phase I RI field investigation. The results of the geophysical mapping are included as Appendix D, Geophysical Survey Report.

- *Phase II RI Field Investigation (AECOM-Tidewater JV 2017b).* The Phase II RI field investigation activities included the installation, development, and sampling of fifteen permanent background monitoring wells for collection of a sitewide background groundwater data. Phase II activities at the former Building 203 AOC included subsurface screening for LNAPL with Laser Induced Fluorescence (LIF); surface soil sample collection on discrete, unbiased grids within two SUs; discrete biased subsurface soil sampling within two SUs to further evaluate the extent of LNAPL impacts; and groundwater sample collection from six newly-installed permanent monitoring wells. Additionally, a sitewide surface water drainage survey was conducted and habitat surveys of multiple AOCs were conducted. The Phase II RI field investigation activities are documented in the Phase II RI Field Investigation Report (AECOM-Tidewater JV 2017b), which provides the laboratory analytical data reports from the Phase II RI field investigation.

10.7 Preliminary Screening Evaluation

A preliminary screening evaluation of the existing Camp Hero dataset was conducted to (1) determine which AOCs needed further evaluation and sampling during the Phase III RI field investigation and (2) refine the list of analytes for sample collection during the Phase III RI field investigation. Results of the preliminary screening evaluation are presented in Appendix E. Additional supplemental analytical results are provided in Appendix F.

10.8 Potential Exposure Pathways and Receptors

The following subsections describe the potential human health and ecological exposure pathways and receptors to be considered for Camp Hero. Refer to Tables 10-1 and 10-2 for a graphical presentation of the potential current and future human health risk pathways, respectively, and Tables 10-3 and 10-4 for potential ecological risk pathways.

10.8.1 Human Health Potential Exposure Pathways and Receptors

The receptors and exposure pathways that will be evaluated in the human health risk assessment (HHRA) based on current and potential future land use are summarized below. Information provided by Brian X. Foley, Deputy Regional Director of the Long Island State Parks Region on April 3, 2017 was used to identify current and potential future land uses that could be relevant to the HHRA. Figures provided by Mr. Foley identified current activities consistent with the use of the area as a state park used for recreational purposes (e.g., camping areas, hiking trails) and that future uses included similar activities with the potential for the addition of more camping areas and trails. No plans for future residential use of the area or groundwater were identified.

As indicated in Section 10.4, a potability evaluation concluded that the shallow perched groundwater at Camp Hero is not suitable as a potable water source. However, the drinking water exposure pathway will be conservatively included in the evaluation of potential future residential exposures, however unlikely, to assess the potential unlimited use/unrestricted exposure (UU/UE). The deeper groundwater zone is not proposed for sampling as the CSM does not indicate that it is expected to be impacted by site activities. The lower productive aquifer in this deeper zone may be potable, but is not currently being used for residential purposes and there are no future-use plans that anticipate using the deeper aquifer for residential purposes.

For future land-use scenarios, it is assumed that there would be some level of construction to convert the area to the desired use. Therefore, it is assumed that current subsurface soil may be brought to the surface and become available for exposure by future receptors. Table 10-1 identifies the current potentially complete human health exposure pathways and Table 10-2 identifies potential future human health exposure pathways.

Human health exposure parameters and equations for the current and future scenarios will be derived primarily from USEPA resources including the Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors (USEPA 2014 and 2015), Exposure Factors Handbook (USEPA 2011), Risk Assessment Guidance for Superfund Parts E and F (USEPA 2004 and 2009), and Supplemental Soil Screening Guidance (USEPA 2002b).

<u>Current and Future On-Site Outdoor Maintenance Worker</u>

Information on current outdoor maintenance workers indicates that employees may repair park equipment or perform grounds maintenance across the park.

Therefore, the HHRA will evaluate an adult park worker scenario for the following pathways:

- Exposure to surface soil (0 to 1 ft bgs) through incidental ingestion, dermal contact, inhalation of airborne particles (i.e., fugitive dust) in outdoor air, and inhalation of vapors from soil;
- Exposure to surface water dermal contact; and
- Exposure to sediment through incidental ingestion and dermal contact.

<u>Current and Future On-Site Park Employee</u>

Information on current on-site workers present at Camp Hero indicates employees (e.g., park police or naturalist) may travel across the park to check abandoned buildings, fences, or environmental study areas.

Therefore, the HHRA will evaluate an adult park worker scenario for the following pathways:

- Exposure to surface soil (0 to 1 ft bgs) through incidental ingestion, dermal contact, inhalation of airborne particles (i.e., fugitive dust) in outdoor air, and inhalation of vapors from soil;
- Exposure to surface water dermal contact; and
- Exposure to sediment through incidental ingestion and dermal contact.

Current and Future Indoor Worker

Information on current on-site indoor workers present at Camp Hero indicates workers that spend time in existing buildings and possible future buildings if land re-development occurs. This receptor is used to address the vapor intrusion exposure pathway only, if volatiles are detected in the groundwater. USEPA (2015a and b) guidance does not recommend using subsurface soil to quantify the vapor intrusion exposure pathway.

Therefore, the HHRA will evaluate an adult indoor worker scenario for the following pathway:

- Exposure to indoor air via volatilization from groundwater (i.e., vapor intrusion).

Current and Future On-Site Recreational Adult and Child

Camp Hero is currently used as a public park. It is anticipated that visitors may spend time walking on trails, picnicking, camping, and wading in stream beds. Streams are intermittent so wading, but not swimming, is possible.

Therefore, the HHRA will evaluate a recreational adult and child scenario for the following pathways:

- Exposure to surface soil (0 to 1 ft bgs) through incidental ingestion, dermal contact, inhalation of airborne particles (i.e., fugitive dust) in outdoor air, and inhalation of vapors from soil;
- Exposure to surface water dermal contact; and
- Exposure to sediment through incidental ingestion and dermal contact.

Current On-Site Trespassing Youth

It is anticipated that trespassers (ages 6 to 16 years old) may climb fences into restricted areas of a DU where current access is restricted. The teen trespasser is used to evaluate current land use exposure to soil, surface water and sediment instead of the recreational user. However, the recreational user is used to evaluate future land use, assuming the fences are removed from the DU.

Therefore, the HHRA will evaluate current trespassing teenager scenarios for the following pathways:

- Exposure to surface soil (0 to 1 ft bgs) through incidental ingestion, dermal contact, inhalation of airborne particles (i.e., fugitive dust) in outdoor air, and inhalation of vapors from soil;
- Exposure to surface water dermal contact; and
- Exposure to sediment through incidental ingestion and dermal contact.

Future On-Site Construction Worker

A construction worker exposure scenario will be evaluated in the HHRA assuming that construction activities may occur in the future. Future excavation activities may result in the subsurface soil being brought to the surface and "mixed" together. Therefore, a total soil data set (0 to 10 ft bgs; or to depth at which groundwater is encountered) will be derived as-needed for surface soil and/or subsurface soil chemicals of potential concern (COPCs), assuming future land re-development occurs.

The exposure pathways that will be evaluated for a construction worker are as follows:

- Exposure to combined surface soil and subsurface soil up to maximum likely depth of excavation through incidental ingestion, dermal contact and inhalation of airborne particles (i.e., fugitive dust) in outdoor air; and inhalation of vapors from soil;
- Exposure to groundwater in an excavation trench through incidental ingestion, dermal contact, and inhalation of air within the trench. Inhalation of excavation trench air will only be evaluated where volatiles in groundwater are identified as COPCs and where groundwater is present within 10 ft bgs.
- Exposure to surface water dermal contact; and
- Exposure to sediment through incidental ingestion and dermal contact.

Potential Future On-Site Resident

There are currently no residential receptors on the site, the area is not currently zoned for residential use, and there are no plans for future residential use (per Mr. Foley of the Long Island State Parks Region on April 3, 2017). However, a residential exposure pathway will be evaluated in the HHRA as a conservative measure of a potential future site use, however unlikely.

The project team completed a groundwater potability analysis of the perched groundwater to support the selection of potential exposure pathways, as well as subsequent risk-based decision throughout the CERCLA process (refer to Appendix G). The analysis revealed that the shallow perched groundwater at Camp Hero is not suitable as a potable water source. However, the drinking water exposure pathway will be assessed in the HHRA to assess the potential UU/UE. If the UU/UE evaluation identifies the potential for unacceptable risk, the exposure pathways for potable water may be removed and the risks re-calculated. Given that there are no future residential land use plans and that the perched groundwater is not potable for several reasons (see Appendix G), the inclusion of this exposure pathway is highly conservative.

The HHRA will evaluate a potential future on-site adult and child residential scenario for the following pathways:

- Exposure to combined surface and subsurface soil (0 to 10 ft bgs, or depth at which groundwater is encountered) through incidental ingestion, dermal contact and inhalation of airborne particles (i.e., fugitive dust) in outdoor air; and inhalation of vapors from soil;
- Exposure to groundwater through ingestion of drinking water and dermal contact and inhalation during bathing;
- Exposure to indoor air via volatilization from the subsurface (i.e., vapor intrusion);
- Exposure to surface water dermal contact; and
- Exposure to sediment through incidental ingestion and dermal contact.

Potential Future Off-Site Resident

Similar to the on-site resident exposure pathway, groundwater is not considered a potable water source for off-site residents. However, to support the evaluation of UU/UE, if groundwater flow reveals downgradient pathways in the direction of off-site residents, then the HHRA will evaluate the off-site use of groundwater by nearby residents. Given that the perched groundwater is not potable for several reasons (see Appendix G), the inclusion of this exposure pathway is highly conservative. If the UU/UE evaluation identifies the potential for unacceptable risk, the exposure pathways for potable water may be removed and the risks re-calculated.

The HHRA will evaluate a potential future off-site adult and child residential scenario for the following pathways:

- Exposure to groundwater through ingestion of drinking water and dermal contact and inhalation during bathing; and
- Exposure to indoor air via volatilization from the subsurface (i.e., vapor intrusion).

10.8.2 Ecological Potential Exposure Pathways and Receptors

The receptors and exposure pathways that will be evaluated in the ecological risk assessment (ERA) based on current and potential future land use are summarized below. The ERA will be conducted in accordance with USEPA's eight-step process for ecological risk assessments under CERCLA (USEPA 1997) and additional guidance including Guidelines for Ecological Risk Assessment (USEPA 1998), The Role of Screening-Level Risk Assessments and Refining Contaminants of

Concern in Baseline Ecological Risk Assessments (USEPA, 2001), and A Guide to Screening Level Ecological Risk Assessment (Tri-Services Environmental Risk Assessment Work Group [TSERAWG] 2008). As agreed to by the team, background conditions will be considered earlier in the ERA process than is typically recommended in ERA guidance (i.e., in Step 2 of the ERA, rather than in Step 3).

The project area includes upland habitats that have been disturbed by past site activities, intermittent and perennial streams, and wetlands. Based on this description, it is anticipated that ecological receptors may come in contact with surface soil (0 to 1 ft bgs) associated with the DUs and surface sediment (0 to 0.5 ft bgs) and surface water associated with exposure areas upstream, adjacent, and/or downstream of groups of soil DUs. Table 10-3 identifies the potentially complete ecological exposure pathways and receptors and Table 10-4 presents ecological assessment and measurement endpoints.

Ecological receptors are not typically directly exposed to groundwater so the pathway to this medium is considered not complete and will not be directly evaluated in the ERA. Ecological receptors are not expected to have significant contact with subsurface soil. The majority of bird and mammal exposure to chemicals of potential ecological concern (COPECs) comes from ingestion of food (plants and soil invertebrates). The majority of plant and invertebrate chemical exposure is from uptake in the upper soil horizon; therefore the exposure pathway for subsurface soil is considered incomplete and will not be evaluated.

The following exposure pathways will be evaluated quantitatively in the ERA:

- Terrestrial plants directly exposed to surface soil within the DUs;
- Soil invertebrates directly exposed to surface soil within the DUs;
- Aquatic organisms (e.g., aquatic invertebrates and amphibian larvae) directly exposed to surface water in the streams/wetlands;
- Benthic invertebrates directly exposed to surface sediments in the streams/wetlands;
- Terrestrial herbivorous birds and mammals exposed through incidental ingestion of surface soil and/or by ingestion of plant parts (e.g., leaves, seeds, roots) that may have taken up COPECs from the soil into their tissues;
- Terrestrial insectivorous birds and mammals exposed through incidental ingestion of surface soil and/or by ingestion of prey items (e.g., earthworms) that may have taken up COPECs from the soil into their tissues;

- Semi-aquatic herbivorous mammals exposed through ingestion of aquatic plant parts that may have taken up COPECs from the soil into their tissues; and
- Semi-aquatic insectivorous birds and mammals exposed through incidental ingestion of surface sediment and/or by ingestion of prey items (e.g., benthic invertebrates) that may have taken up COPECs from the sediment or surface water into their tissues.

Based on the intermittent nature of the stream and the shallow water conditions within the wetland, fish are not expected to be present. Therefore, evaluation of piscivorous wildlife is not warranted. Semi-aquatic herbivorous birds such as ducks and geese are also not expected to spend a significant amount of time within the aquatic habitat available on-site.

In general, ingestion of food items and, in some cases, incidental ingestion of soil or sediment are typically primary exposure pathways for birds and mammals. Other exposure pathways may be complete, but are not evaluated quantitatively. Inhalation of contaminated dust by birds and mammals is expected to be insignificant because the site is well vegetated and dust generation is minimal. VOCs may volatilize into soil air spaces from soil and migrate to the soil surface where they may be emitted to the atmosphere, but scientific data to estimate exposure of wildlife is lacking, so the pathway is not evaluated quantitatively. Exposure to VOCs by breathing contaminated air is expected to be insignificant compared to exposure by ingestion pathways. Dermal absorption of surface soil contaminants is potentially complete for ecological receptors, but scientific data to estimate exposure of wildlife is lacking, so the pathway is not evaluated quantitatively. Exposure to COPECs by dermal absorption or via the drinking water pathway for wildlife is expected to be insignificant compared to exposure by food ingestion pathways.

The following wildlife receptors will be considered in the ERA:

- American robin (*Turdus migratorius*) - insectivore foraging in upland areas and in stream/wetland areas;
- Mourning dove (*Zenaida macroura*) - herbivore foraging in upland areas;
- Meadow vole (*Microtus pennsylvanicus*) - herbivore foraging in upland areas and in stream/wetland areas; and
- Masked shrew (*Sorex cinereus*) - insectivore foraging in upland areas and in stream/wetland areas.

Table 10-4 summarizes the assessment and measurement endpoints that will be included in the Screening Level Ecological Risk Assessment (SLERA). The soil screening benchmarks for plants and soil invertebrates will be consistent with those used to screen the existing data in Appendix D. The surface water and sediment screening benchmarks will be obtained from NYSDEC guidance documents (NYSDEC, 1998 and 2014). If screening benchmarks are not available from NYSDEC sources, then other literature sources will be considered.

Risks to mammals and birds from exposure to COPECs will be evaluated using food chain models to estimate the Total Daily Dose (TDD) which will be compared to TRVs representing acceptable daily doses in mg/kg-day. Detected chemicals will be evaluated using a food chain model if the chemicals is identified as an 'important bio-accumulative compound' by USEPA (2000; Table 4-1).

TRVs incorporated into the quantitative evaluation of potential ecological risks to wildlife will be obtained from the following sources: TRVs derived according to USEPA guidance (USEPA, 2005) during the development of Eco-SSLs, ORNL publication Toxicological Benchmarks for Wildlife: 1996 Revision (Sample et al,. 1996), and the LANL EcoRisk Database (LANL, 2015). When TRVs are not derived in these documents, the literature will be reviewed for relevant data and TRVs will be derived using the methodology of ORNL (Sample et al., 1996). TRVs used in the SLERA will be based on No Observed Adverse Effect Levels (NOAELs).

Chemical concentrations in food items will be calculated using bioaccumulation factors (BAFs) and other uptake factors from published sources or regression equations from the USEPA Eco-SSL Guidance (USEPA, 2007) and other literature sources (e.g., Bechtel Jacobs, 1998a,b). The USEPA's Biota-Sediment Accumulation Factor (BSAF) database will be used as a primary source to identify sediment-to-invertebrate uptake factors for organic chemicals. Soil-based uptake factors may be used when sediment-specific uptake factors are not identified.

Exposure assumptions (e.g., body weights, relative consumption of food items, foraging range, exposure duration, etc.) for wildlife species will generally be obtained from the USEPA's Wildlife Exposure Factors Handbook (USEPA, 1993). Allometric equations (Nagy, 2001) will be used to estimate food ingestion rates.

10.9 Selection of Decision Units for Further Investigation

A total of 21 AOCs, plus 6 segments of the WDS AOC, warrant further assessment based on the results of the preliminary screening evaluation (Appendix E). AOCs warranting additional sampling were grouped into 18 geometric DUs for the Phase III investigation. DUs will create a more robust dataset and will establish representative EPCs from a realistic exposure area for potential human health and ecological receptors.

The DUs will be approximately 0.5 acre or 1 acre exposure areas, consistent with the extent of potential impacts from prior investigations and the range of human health and ecological receptor potential exposure areas. In general, the DUs will be designed as geometric squares, but the sampling protocol within the DUs may be adjusted, were appropriate, to account for nearby fences, roads, steep slopes, drainage channels, or similarly significant geographic features. Sample collection and sample depths may vary in areas with limited accessibility within each of the DUs; however, the entire DU boundary will still be considered the "exposure area" for quantification of potential risks to receptors. Table 10-5 and Figure 10-4 present the DU groupings for the Phase III RI field investigation.

10.10 Conceptual Site Models of Decision Units

The following subsections briefly summarize the DU-specific CSMs that provide the basis and framework for developing the sampling and analysis plan to complete the RI phase of the CERCLA process. For simplicity, analytical parameter groups warranting further analysis are referred to as VOCs, SVOCs, PCBs, and metals in this worksheet. However, the specific analytes to be evaluated within each parameter group have been refined based on the Preliminary Screening Evaluation (Appendix E) and other specific project needs. Refer to Worksheet #15 for specific details on the parameter groups and specific parameters selected for this Phase III RI field investigation. Refer to Worksheet #17 and specifically Figures 17-1 through 17-20 for the sampling design associated with the Phase III RI field investigation.

Sitewide Surface Water and Sediment

- Study Area: Sitewide surface water and sediment samples grouped into exposure areas, which are intended to be upstream, adjacent, and/or downstream of groups of soil DUs, and are intended for assessment of potential DU contributions, as well as broader drainage channel conditions along longer stretches of the channels. The grouping of datasets into exposure areas may consider factors such as the analytical results, physical characteristics of the drainage channel sediment, surface water conditions at the time of sampling (i.e., wet or dry), and proximity to nearby DUs. Separate EPCs will be generated for each exposure area.
- Potential Impacts: Surface water and sediment has not yet been assessed. It is unclear if environmental impacts from the various DUs have impacted the local network of drainage channels. Based on the preliminary screening evaluation of soil, metals and SVOCs warrant further assessment in surface and subsurface soil at the majority of the DUs. Additional parameters warrant further assessment in surface and subsurface soil at select DUs, including PCBs at DU15 and VOCs at DU01. Based on these results, surface water and sediment in the vicinity of the DUs warrant further assessment for metals (dissolved and total) and SVOCs (total) sitewide and additional parameter groups identified at select DUs, as described below in the DU-specific CSMs.
- Potentially Impacted Media and Data Needs: Surface water and sediment sampling is required on a sitewide scale upstream of all of the DUs to assess reference upstream drainage channel

conditions and to establish BTVs. In addition, surface water and sediment sampling is required in multiple exposure areas upstream, adjacent, and/or downstream of groups of soil DUs.

- Sampling Design Considerations: Because many of the streams and drainage channels transect multiple DUs, surface water and sediment should be evaluated at a sitewide scale and within specific exposure areas (stream segments). Upstream locations should be selected which are upstream of all DUs. Additionally, due to the presence of wooden revetments along the stream channels, one set of upstream samples should be collected from streams with wooden revetments; an additional set of upstream samples should be collected from streams without wooden revetments. Other sampling locations could be downstream of one DU but upgradient of another DU. Refer to Worksheet #17 for a discussion of how the surface water and sediment EPCs should be calculated on a sitewide scale and within exposure areas. To ensure data is comparable at a sitewide scale, all surface water and sediment samples should be evaluated for selected SVOCs and metals at minimum. Additional parameters for surface water and sediment should be evaluated at individual exposure areas as necessary depending on each CSM. Refer to the DU-specific CSMs provided below for more detail.

Sitewide Groundwater

- Study Area: Sitewide groundwater, with specific focus in the near-vicinity of DUs that have exhibited the potential for groundwater impacts..
- Potential Sitewide Impacts: Background groundwater monitoring wells were constructed in upgradient locations of Camp Hero and were used to derive groundwater BTVs. DU-specific groundwater monitoring wells were constructed in the vicinity of DU01. There are no other permanent groundwater monitoring wells at Camp Hero, and an assessment of sitewide groundwater has not yet been conducted. Grab groundwater samples were collected during prior investigations, which were useful to support the DU-specific CSMs; however, because the grab groundwater samples were not collected from developed wells, were not sampled via low-flow sampling procedures, and exhibited extreme turbidity, they are not considered suitable for assessing true groundwater conditions. Based on the preliminary screening evaluation of soil, as well as field screening of the grab groundwater samples collected during prior investigations, potential sitewide groundwater impacts could include SVOCs and metals, as well as some additional parameters in focused areas, as described below.
- Potential Focused Impacts: VOCs warrant further assessment in groundwater near DU01 due to the presence of LNAPL. Additionally, VOCs warrant further assessment in the vicinity of the former AOCs AST-35, Fuel Pump House (FPH), and Suspected Tank B (STB) due to field observations (including petroleum odor, staining of soil cores, and sheen on turbid groundwater from temporary wells) indicating potential petroleum impacts to groundwater. PCBs warrant

assessment at DU15 to refine the CSM relative to prior detections of PCBs in the turbid grab groundwater samples.

- Sample Design Considerations: A network of groundwater monitoring wells should be constructed across Camp Hero, with specific focus in the near-vicinity of DUs that have exhibited the potential for groundwater impacts. The well network will include the existing background wells (which do not require further sampling), as well as the existing DU01 wells (which should be sampled for a second round of groundwater data). It is expected that all new wells will be constructed within perched groundwater, not the lower productive aquifer. The sample design should consider an appropriate depth of each well, as well as the specific screen interval to intersect sufficient groundwater for well development and low-flow sampling.

DU01: Former Building 203 Area

- Associated Former AOCs: Former Building 203. The DU boundary encompasses LNAPL impacts and the prior surface soil sampling grid. It is bounded by a nearby fence to the west and includes an area of limited accessibility due to steep terrain. The northwest and western portions of the DU include steep terrain. The sample locations in those areas may be offset to avoid the steep terrain.
- Potential Site Impacts: VOCs, SVOCs, PCBs, and TAL metals were assessed in surface soil and subsurface soil during previous investigations. VOCs, SVOCs, and TAL metals were assessed in groundwater from permanent monitoring wells during previous investigations. Based on the preliminary screening evaluation for soil, VOCs, SVOCs, and metals warrant further assessment. In addition, field observations from previous investigations indicate the residual presence of LNAPL in the subsurface of this area, ranging from approximately 8 to 34 ft bgs.
- Potentially Impacted Media and Data Needs: An unbiased grid of surface soil samples was collected and analyzed during the Phase II RI, which is sufficient for calculating EPCs and conducting risk assessments. No further surface soil characterization is necessary to support the RI/FS phase of study. Subsurface soil and associated groundwater warrant further evaluation of VOCs based on the detection of chlorinated VOCs in groundwater and petroleum-related VOCs in soil and groundwater (from existing permanent monitoring wells). Subsurface soil and groundwater also warrant further evaluation of SVOCs and metals based on the preliminary screening evaluation. In addition, a more detailed evaluation of physical subsurface characteristics is warranted to support the FS in developing and evaluating candidate response actions for LNAPL. Groundwater will also be analyzed for selected geochemical and MNA parameters to support the FS.
- Sampling Design Considerations: Subsurface soil in a portion of this DU, from an approximate depth range of 0 to 20 ft bgs, was excavated and backfilled during the removal of two former

petroleum-related USTs. Although it is not typical to collect samples of backfill, in this case, samples of backfill within DU01 will be included in the unbiased 1 to 10 ft bgs subsurface sampling grid to generate a representative EPC for the entire subsurface soil exposure area. LNAPL is not expected to be encountered in the majority of the 1 to 10 ft bgs subsurface soil sampling horizon because the LNAPL has generally been encountered below that depth. There was petroleum-impacted subsurface soil reported in the 1 to 10 ft bgs depth range during prior investigations, but those impacts are not expected to include LNAPL. Based on the working CSM for this area, the extent of LNAPL impacts is expected to be primarily within the 8 to 34 ft bgs depth range.

DU02: H-2 Drum Area

- Associated Former AOCs: Drum Location (H-2). The DU boundary encompasses an existing drum remnant that is bounded by a fence on the east. This DU is intended to assess potential impacts and exposures west of the fence in the direction of overland surface water flow and groundwater flow. An adjacent DU (DU01) will assess the area east of the fence.
- Potential Site Impacts: Potential drum contents (unknown). VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface and shallow subsurface soil during previous investigations. Based on the preliminary screening evaluation, metals in surface soil warrant further assessment. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals could pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals. Surface water and sediment downgradient of this DU also warrant further evaluation of metals associated with potential soil impacts, as well as SVOCs to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. SVOCs from DU01 or DU03 could be a potential source of SVOCs in this surface water and sediment exposure area. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed sitewide with a network of groundwater monitoring wells.

DU03: Drum Location H-1

- Associated Former AOCs: Drum Location (H-1). The DU boundary encompasses an existing drum remnant to assess potential impacts and exposures. The southern portion of the DU includes wetlands. The sample depths within the wetlands may be shallower to avoid impacts to the wetlands and to match the most likely exposure depths to potential human health and ecological receptors (i.e., 0 to 1 foot and 1 to 2 feet).
- The DU boundary encompasses LNAPL impacts and the prior surface soil sampling grid. It is bounded by a nearby fence to the west and includes an area of limited accessibility due to steep

terrain. The northwest and western portions of the DU include steep terrain. The sample locations may be offset to avoid the steep terrain.

- Potential Site Impacts: Potential drum contents (unknown). VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface and shallow subsurface soil during the previous investigations. Based on the preliminary screening evaluation, metals and SVOCs in surface soil warrant further assessment. The presence of cadmium in excess of screening criteria and BTVs could be an indication that other metals could pose potential environmental impacts. Additionally, the presence of SVOCs in subsurface soil warrant further investigation.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals; surface and subsurface soil warrant further evaluation of SVOCs. Surface water and sediment transecting and downgradient of this DU also warrant further evaluation of metals and SVOCs associated with potential soil impacts. These parameter groups are also consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed as part of the sitewide network of groundwater monitoring wells.

DU04: H-18 Drum Area

- Associated Former AOCs: Drum Location (H-18). The DU boundary encompasses an existing drum remnant at the top of the slope in the western portion of the DU. This DU is intended to assess potential impacts and exposures in the operational and recreational area along the gravel access road and other unmarked paths, north of Battery 112. The DU is bounded by steep terrain on the east and west boundaries, which have a more limited potential for exposure.
- Potential Site Impacts: Potential drum contents (unknown). VOCs, SVOCs, PCBs, and metals (except mercury) were assessed in surface and shallow subsurface soil during the previous investigations. Based on the preliminary screening evaluation, metals in surface soil warrant further assessment. The presence of thallium in excess of screening criteria and BTVs could be an indication that other metals could pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals. No drainage channels or streams directly transect or are directly downgradient of this DU; surface water and sediment will be assessed at a sitewide scale. Additionally, no sources to groundwater impacts are anticipated in this DU; groundwater will be assessed at a sitewide scale.

DU05: WDS Cesspool Area

- Associated Former AOCs: WDS Borings -SB25 through -SB27. The DU boundary encompasses the former cesspool area. This DU is intended to assess potential impacts and exposures in the vicinity of the cesspool area and to the east of that area, in the direction of overland surface water flow and groundwater flow. It is bounded by a nearby road (Camp Hero State Park Road) to the west and includes an area of limited accessibility due to steep terrain. The western portion of the DU includes steep terrain. The sample locations in that area may be offset to avoid the steep terrain.

- Potential Site Impacts: Cesspools associated with the former sitewide waste disposal system. VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in subsurface soil during the previous investigations. Based on the preliminary screening evaluation, metals in subsurface soil warrant further assessment. The presence of arsenic and iron in excess of screening criteria and BTVs could be an indication that other metals could pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface and subsurface soil warrant further evaluation for metals based on exceedances in subsurface soil. Surface water and sediment downgradient of this DU also warrant further evaluation of metals associated with potential soil impacts, as well as SVOCs to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. SVOCs from DU06 could be a potential source of SVOCs in this surface water and sediment exposure area. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU06: Former Power Plant Area

- Associated Former AOCs: Former Power Plant (H-11), former Sewage Ejector Station (H-12), WDS Borings -SB23 through -SB24 (Tile Field). The DU boundary encompasses these former operational areas to assess potential impacts and exposures. The southern portion of the DU includes coal fragments. The sample locations and depths within the coal fragments will be the same as the rest of this DU.
- Potential Site Impacts: At the former Power Plant (H-11), SVOCs (PAHs only), PCBs, and TAL metals (except mercury) were assessed in surface and subsurface soil during the previous investigations. At the former Sewage Ejector Station (H-12), VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface and subsurface soil during the previous investigations. At the WDS Borings -SB23 through -SB24 (Tile Field), VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in subsurface soil during the previous investigations. Based on the preliminary screening evaluation, lead in surface soil warrants further assessment. In addition, the presence of lead in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts. Based on the preliminary screening evaluation, PAHs and metals in subsurface soil warrant further assessment. In addition, the presence of PAHs in subsurface soil could be an indication that PAHs in surface soil pose potential environmental impacts. The exceedance of PAHs is also consistent with the field observation of coal at the site.

- Potentially Impacted Media and Data Needs: Surface and subsurface soil warrant further evaluation for metals based on the exceedances of metals in surface and subsurface soil. Surface and subsurface soil warrant further evaluation for SVOCs based on the field observations of coal and the exceedance of PAHs in subsurface soil. Surface water and sediment transecting and downgradient of this DU warrant further evaluation of SVOCs and metals associated with potential soil impacts. These parameter groups are also consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU07: H-19, H-20 AST/Drum Area

- Associated Former AOCs: Former AST (H-19), Drum Location (H-20), Possible Boiler (H-9). The DU boundary encompasses these former items to assess potential impacts and exposures. The eastern portion of the DU includes wetlands. The sample depths within the wetlands may be shallower to avoid impacts to the wetlands and to match the most likely exposure depths to potential human health and ecological receptors (i.e., 0 to 1 foot and 1 to 2 feet).
- Potential Site Impacts: Potential drum, boiler, and AST contents (unknown). During previous investigations, VOCs, SVOCs (PAHs only), and metals were assessed in surface soil at the former AST (H-19); VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface and shallow subsurface soil at Drum Location H-20; and SVOCs (PAHs only) and TAL metals (except mercury) were assessed in surface soil at the Possible Boiler (H-9). Based on the preliminary screening evaluation, metals in surface and subsurface soil warrant further assessment. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts. In addition, PAHs in subsurface soil warrant further assessment based on the preliminary screening evaluation. The presence of PAHs in subsurface soil could be an indication that PAHs in surface soil pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface and subsurface soil warrant further evaluation for metals based on the exceedances of metals in surface and subsurface soil. Surface and subsurface soil warrant further evaluation for SVOCs based on the exceedance of SVOCs in subsurface soil. Surface water and sediment transecting and downgradient of this DU warrant further evaluation of SVOCs and metals associated with potential soil impacts. These parameter groups are also consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU08: WDS Chlorine Contact Chamber Area

- Associated Former AOCs: WDS Borings -SB01 through -SB03 (Chlorine Contact Chamber). The DU boundary encompasses the former chlorine contact chamber. This DU is intended to assess potential impacts and exposures in the vicinity of the chamber and north of the chamber along the waste disposal system pipeline. The northern portion of the DU includes wetlands. The sample depths within the wetlands may be shallower to avoid impacts to the wetlands and to match the most likely exposure depths to potential human health and ecological receptors (i.e., 0 to 1 foot and 1 to 2 feet).

- Potential Site Impacts: The sitewide sanitary sewer system was connected to a chlorine contact chamber for treatment prior to discharging into the Atlantic Ocean at a headwall outfall. VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface soil and shallow subsurface soil during the previous investigations. Based on the preliminary screening evaluation, metals in surface soil warrant further assessment. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts. In addition, SVOCs in surface and subsurface soil warrant further assessment based on the preliminary screening evaluation.

- Potentially Impacted Media and Data Needs: Surface soil warrant further evaluation for metals based on the exceedances of metals in surface soil. Surface and subsurface soil warrant further evaluation for SVOCs based on the exceedance of SVOCs in subsurface soil. Surface water and sediment transecting and downgradient of this DU warrant further evaluation of SVOCs and metals associated with potential soil impacts. These parameter groups are also consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU09: H-15 Coal Storage Area

- Associated Former AOCs: Former Coal Storage (H-15). The DU boundary encompasses a former coal storage area to assess potential impacts and exposures. There are no anticipated access limitations within this DU.

- Potential Site Impacts: Former coal storage area. SVOCs (PAHs only) and TAL metals (except mercury) were assessed in surface soil during the previous investigations. Based on the preliminary screening evaluation, metals in surface soil warrant further assessment. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts.

- Potentially Impacted Media and Data Needs: Surface soil warrant further evaluation for metals based on the exceedances of metals in surface soil. No drainage channels or streams directly transect or are directly downgradient of this DU; surface water and sediment will be assessed at a sitewide scale. There is no evidence of potential DU-specific groundwater impacts; groundwater will be assessed at a sitewide scale.

DU10: H-5 Drum / Debris Area

- Associated Former AOCs: Drum Location with Construction Debris (H-5). The DU boundary encompasses a former drum remnant area to assess potential impacts and exposures. There are no anticipated access limitations within this DU.
- Potential Site Impacts: Potential former drum contents (unknown) and construction debris. VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface soil and shallow subsurface soil during the previous investigations. Based on the preliminary screening evaluation, metals in surface soil warrant further assessment. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface soil warrant further evaluation for metals based on the exceedances of metals in surface soil. Surface water and sediment in intermittent drainage transecting and downgradient of this DU also warrant further evaluation of metals associated with potential soil impacts, as well as SVOCs to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. SVOCs from DU11 could be a potential source of SVOCs in this surface water and sediment exposure area. There is no evidence of potential DU-specific groundwater impacts; groundwater will be assessed at a sitewide scale.

DU11: H16 / WDS Septic / former Building 34 Area

- Associated Former AOCs: Former Building 34, Former Sewage Treatment Area (H-16), Motor Pool Boring –SB02 (Drain) and –SB03 (Cesspool). The DU boundary encompasses these former operational areas to assess potential impacts and exposures. This DU is bounded by a road to the north (Camp Hero State Park Road) and a fence to the west. There are no anticipated access limitations within this DU.
- Potential Site Impacts: At former Building 34, SVOCs (PAHs only), PCBs, and TAL metals (except mercury) were assessed in surface soil and subsurface soil during the previous investigations. At the former Sewage Treatment Area (H-16), VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface soil and subsurface soil during the previous investigations. At Motor Pool Borings –SB02 (Drain) and –SB03 (Cesspool), VOCs, SVOCs, PCBs, and energetics were assessed in surface soil and subsurface soil during the previous investigations. Based on

the preliminary screening evaluation, SVOCs and metals warrant further evaluation in surface soil. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts.

- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals and SVOCs based on the exceedances in surface soil. Surface water and sediment in the exposure area transecting and downgradient of this DU warrant further evaluation of SVOCs and metals associated with potential soil impacts. These parameter groups are also consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU12: WDS Manhole Area 1

- Associated Former AOCs: WDS Borings -SB08 through -SB09 (Box and Manhole). The DU boundary encompasses portions of the former waste disposal system and storage area. This DU boundary was generated to encompass both sides of the road (Camp Hero State Park Road) to create the minimum exposure area (1/2 acre) to assess potential impacts and exposures. Sample locations in the vicinity of the roadway may be offset to avoid the roadway.
- Potential Site Impacts: An underground box and manhole associated with the former sitewide waste disposal system. VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in subsurface soil during the previous investigations. Based on the preliminary screening evaluation, SVOCs in subsurface soil warrant further evaluation. Presence of SVOCs in subsurface soil could be an indication that SVOCs in surface soil may also pose an environmental concern.
- Potentially Impacted Media and Data Needs: Surface and subsurface soil warrant further evaluation SVOCs based on the exceedances in subsurface soil. Surface water and sediment transecting and downgradient of this DU warrant further evaluation of SVOCs associated with potential soil impacts, as well as metals to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU13: H-14 Coal Storage Area

- Associated Former AOCs: Former Coal Storage (H-14). The DU boundary encompasses a former coal storage area to assess potential impacts and exposures. This DU is bounded by a road to the north (Camp Hero State Park Road). There are no anticipated access limitations within this DU.

- Potential Site Impacts: Former coal storage area. SVOCs (PAHs only) and TAL metals (except mercury) were assessed in surface soil during the previous investigations. Based on the preliminary screening evaluation, metals warrant further evaluation in surface soil. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals (mercury not previously analyzed) could also pose potential environmental impacts. The exceedance of metals is also consistent with the historic use of coal storage at the site.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals based on the exceedances in surface soil. No streams or drainage features directly transect this DU, but surface water and sediment in the vicinity will be included in the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU14: WDS Septic Tank Area

- Associated Former AOCs: WDS Borings -SB06 through -SB07 (Suspected Septic Tank). The DU boundary encompasses a suspected septic tank area associated with the former site-wide waste disposal system to assess potential impacts and exposures. This DU is bounded by a road to the south (Camp Hero State Park Road). There are no anticipated access limitations within this DU.
- Potential Site Impacts: A suspected septic tank associated with the former sitewide waste disposal system. VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in subsurface soil during the previous investigation. Based on preliminary screening evaluation, SVOCs in subsurface soil warrant additional investigation. Presence of SVOCs in subsurface soil could be an indication that SVOCs in surface soil may also pose an environmental concern.
- Potentially Impacted Media and Data Needs: Surface and subsurface soil warrant further evaluation SVOCs based on the exceedances in subsurface soil. Surface water and sediment in the exposure area transecting and downgradient of this DU warrant further evaluation of SVOCs associated with potential soil impacts, as well as metals to be to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU15: H-6 Debris Area

- Associated Former AOCs: Construction Debris Area (H-6). The DU boundary encompasses a former drum remnant area to assess potential impacts and exposures. The southern portion of the DU potentially includes wetlands. If present, the sample depths within the wetlands may be shallower to avoid impacts to the wetlands and to match the most likely exposure depths to potential human health and ecological receptors (i.e., 0 to 1 foot and 1 to 2 feet).

- Potential Site Impacts: An area of construction debris. PCBs and lead were assessed in surface soil during the previous investigation. Based on the preliminary screening evaluation, lead in surface soil warrants further assessment. In addition, the presence of lead in excess of screening criteria and BTVs could be an indication that other metals (not previously analyzed) could also pose potential environmental impacts. In additional to surface soil data, Arochlor-1254 was detected in shallow groundwater in a turbid grab-groundwater sample, which could indicate potential PCBs in soil.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals based on the exceedance of lead. Surface and subsurface soil warrant further evaluation for PCBs. Nearby surface water and sediment warrants further evaluation of metals and PCBs downstream of potential soil impacts, as well as SVOCs to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. Groundwater warrants further evaluation for metals and PCBs, to validate the absence of PCBs if they are due to TSS in the prior turbid grab-groundwater sample, as well as SVOCs and metals to be consistent with the sitewide groundwater evaluation.

DU16: WDS Manhole Area 2

- Associated Former AOCs: WDS Boring -SB13 (Manhole). The DU boundary encompasses a portion of the former waste disposal system to assess potential impacts and exposures. This DU is bounded by roads to the west and south (Camp Hero State Park Road). There are no anticipated access limitations within this DU.
- Potential Site Impacts: A manhole associated with the former sitewide waste disposal system. VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in subsurface soil during the previous investigation. Based on preliminary screening evaluation, SVOCs in subsurface soil warrant additional investigation. Presence of SVOCs in subsurface soil could be an indication that SVOCs in surface soil may also pose an environmental concern.
- Potentially Impacted Media and Data Needs: Surface and subsurface soil warrant further evaluation SVOCs based on the exceedances in subsurface soil. No streams or drainage features directly transect this DU. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU17: H-4 Debris Area

- Associated Former AOCs: Construction Debris Area (H-4). The DU boundary encompasses an area of former debris to assess potential impacts and exposures. This DU is bounded on the south by an existing concrete foundation from a former building, as well as an existing fenced municipal waste storage area. There are no anticipated access limitations within this DU.
- Potential Site Impacts: An area of construction debris. PCBs and lead were assessed in surface and subsurface soil during the previous investigation. Based on the preliminary screening evaluation, lead in surface soil warrants additional investigation. The presence of lead in excess of screening criteria and BTVs could be an indication that other metals could pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals. Surface water and sediment transecting and downgradient of this DU also warrant further evaluation of metals associated with potential soil impacts, as well as SVOCs to be consistent with the sitewide evaluation of SVOCs and metals in surface water and sediment. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

DU18: H-3 Drum Area

- Associated Former AOCs: Drum Area (H-3). The DU boundary encompasses a former drum remnant area to assess potential impacts and exposures. The western portion of the DU includes wetlands. The sample depths within the wetlands may be shallower to avoid impacts to the wetlands and to match the most likely exposure depths to potential human health and ecological receptors (i.e., 0 to 1 foot and 1 to 2 feet).
- Potential Site Impacts: Potential drum contents (unknown). VOCs, SVOCs, PCBs, and TAL metals (except mercury) were assessed in surface and shallow subsurface soil during the previous investigations. Based on the preliminary screening evaluation, metals in surface soil warrant additional investigation. The presence of some metals in excess of screening criteria and BTVs could be an indication that other metals could pose potential environmental impacts.
- Potentially Impacted Media and Data Needs: Surface soil warrants further evaluation for metals. No streams or drainage features directly transect this DU. There is no evidence of potential DU-specific groundwater impacts; however, groundwater will be assessed in this area as part of the sitewide network of groundwater monitoring wells.

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Worksheet #11: Data Quality Objectives/Systematic Planning Process Statements

The planned Phase III RI field investigation is designed to complete the RI phase of the CERCLA process, as well as provide data to support risk-based decisions and the subsequent sitewide FS. In general, this Phase III RI field investigation will refine the CSMs for the individual DUs established at the site, as well as provide a regional depiction of sediment quality and establish a representative network of sitewide groundwater monitoring wells. Data quality objectives (DQOs) are developed in this worksheet based on the Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G4, EPA/240/B-6/001) (EPA, February 2006) and are presented below.

11.1 Problem Statement

The project team initially identified 47 AOCs based on prior site operations and uses, completed a preliminary screening evaluation of available analytical results, and subsequently defined 18 individual Decision Units (DUs). Current data for the 18 DUs is insufficient and does not adequately define the nature and extent of potential contamination in support of the following RI components: 1) Fate & transport, 2) SLERA, and 3) HHRA.

11.2 Study Goals

The project team will collect surface soil, subsurface soil, groundwater, surface water, and sediment samples, as well as analytical parameters, to establish representative datasets and EPCs for quantifying potential human health and ecological risks. Sampling locations for groundwater, surface water, and sediment will be established on a sitewide scale, along with DU-specific or exposure area-specific sampling locations where necessary to assess potential local impacts from upgradient or upstream DUs. Sampling locations for surface soil and subsurface soil will be collected only within the DUs.

Parameters selected for analysis will be based on (1) parameters that exceed the preliminary screening evaluation of Phase I and II sampling and analysis results (refer to Appendix E), (2) the CSM for each DU relative to additional parameters that could be present but have not yet been analyzed, and (3) data needs for the FS, such as geochemical and MNA parameters. To achieve these overall project objectives, the following specific DQOs are appropriate:

- Goal 1 – Collect a representative dataset for potentially impacted surface and subsurface soil associated with each of the individual DUs. Calculate EPCs to quantify potential risks.

- Goal 2 – Collect a representative dataset for surface water and sediment at a sitewide scale, as well as in exposure areas the vicinity of DUs that could potentially impact downgradient surface water and sediment. Calculate EPCs to quantify potential risks.

- Goal 3 – Establish a representative groundwater monitoring well network and collect groundwater samples on a sitewide scale, as well as on a local scale in the vicinity of DUs that could potentially (or have been demonstrated to) have localized groundwater impacts.
- Goal 4 – Collect additional physical and chemical data to support the CSM, risk assessments, and FS.

11.3 Information Inputs

Information inputs used to develop this SAP consist of prior study reports, available analytical data, available site-specific background data, preliminary screening criteria, consideration of potential human health and ecological exposure pathways and receptors, and consideration of potential data needs to support the FS. Refer to Worksheet #10 for an inventory of prior investigations and reports. Additional information inputs that will be generated from the Phase III RI field investigation described in this SAP will include the following items:

- Field observations and measurements, including geologic logs, ambient air [Photo Ionization Detector (PID)) measurements, water quality parameters, GPS coordinates, and survey data.
- Surface soil samples (0 to 1 ft bgs).
- Subsurface soil samples (1 to 10 ft bgs or 1 to 2 ft bgs in wetland soils).
- Groundwater samples from permanent monitoring wells.
- Surface water and sediment samples.
- Chemical and physical data to support the FS.

11.4 Study Area Boundaries

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, NY, approximately 5 miles east of the Village of Montauk (Figure 10-1). The park consists of 469 acres and is bound by Montauk Highway (Route 27) to the north, the Atlantic Ocean to the south, Montauk Point State Park to the east, and Camp Hero State Park's undeveloped sanctuary area to the west. General spatial and temporal boundaries are described below.

Spatial Boundaries

A total of 18 separate DUs have been identified at Camp Hero for sampling during the Phase III RI field investigation, as established in Worksheet #10 of this SAP (refer to Table 10-5 and Figure 10-4). In general, some DUs are bound by nearby fences, roads, steep slopes, drainage channels, or similarly significant geographic features which create areas with limited accessibility. Sample collection and sample depths may vary in areas with limited accessibility within each of the DUs; however, the entire DU boundary will still be considered the "exposure area" for quantification of potential risks to receptors

Specifically, areas of limited accessibility are anticipated at DU01, DU03, DU05, DU08, and DU17. At DU01, steep terrain and heavy vegetation in the North and West portions will be inaccessible to the direct push drill rig. At DU05, steep terrain along the center of the DU may be inaccessible to the direct push drill rig. At DU17, a small portion of the DU is covered with cement; surface soil samples will not be collected from this area. At DU03 and DU08, wetland and marsh conditions paired with heavy vegetation may create inaccessible areas for the direct push drill rig throughout the majority of the DU. Alternate sampling approaches for these areas are described in Section 11.5 below.

Temporal Boundaries

The temporal boundaries for this study will be the Phase III RI field investigation, anticipated to begin after Memorial Day 2017 and end during June 2017, with an objective to demobilize prior to the July 4th holiday.

11.5 Sampling Strategy

The sampling strategy for this Phase III RI field investigation is to implement a comprehensive field investigation to complete the RI phase of the CERCLA process. Refer to Worksheet #17 for the specific sampling design and rationale. In general, unbiased sampling grids will be established for surface soil and subsurface soil sampling locations within applicable DUs. Surface water and sediment samples will be collected in a linear fashion within streams in exposure areas upstream, adjacent, and/or downstream of groups of soil DUs. These datasets will be used to generate a robust dataset that will be considered representative of the conditions to which potential receptors could be exposed. Human health receptors could be exposed to surface soil (0 to 1 ft bgs) for potential surface soil exposure pathways and receptors, and exposed to subsurface soil (1 to 10 ft bgs or 1 to 2 ft bgs in wetland soils) for potential subsurface exposure pathways and receptors. Ecological receptors could be exposed to surface soil (0 to 1 ft bgs) for potential exposure pathways and receptors. Refer to Tables 10-1 through 10-4 or the selected human health risk assessment and ecological risk assessment potential exposure pathways and receptors.

As described above, areas of limited accessibility areas are anticipated at DU01, DU03, DU05, DU08, and DU17 due to steep terrain, heavy vegetation, or wetland/marsh conditions. At DU03 and DU08, wetland and marsh conditions paired with heavy vegetation may create inaccessible areas for a drill rig throughout the majority of the DU. At areas inaccessible for a drill rig due to steep terrain, sample locations may be off-set within the DU boundary or collected with a hand auger to shallower depths. In wetland areas, hand augers will be used to collect subsurface soil to the depth possible, to avoid damage to the wetlands. In general, the team expects that the maximum depth of hand-augering will be in the vicinity of 2 to 4 ft bgs. If unanticipated inaccessible areas are encountered during the Phase III RI field investigation (either horizontally or vertically), the sampling locations will be adjusted as necessary to ensure collection of the minimum number of samples.

Biased sample locations will be selected for the placement and construction of groundwater monitoring wells. Groundwater across the site and within the vicinity of DUs is considered to be generally spatially correlated, which allows a biased sampling design while still achieving a representative dataset.

11.6 Analytical Approach

The analytical approach for the planned Phase III RI field investigation includes specific "if… then…" statements to expand upon the study goals established earlier in this worksheet. These decision statements will guide the sampling design, and will be continually referenced by the team in evaluating the results of the investigation and proceeding with risk-based decisions.

Goal 1 – Collect a representative dataset for potentially impacted surface and subsurface soil associated with each of the individual DUs. Calculate EPCs to quantify potential risks.

- For each DU, design a uniform 0.5 to 1 acre geometric exposure area to encompass impacted surface and subsurface soil identified through prior investigations and the preliminary screening evaluation.
- Design an unbiased sampling grid consisting of a minimum of 15surface soil sampling locations and a minimum of 15 subsurface soil sampling locations, to generate a representative dataset for surface soil and subsurface soil, which will be suitable for statistical evaluation and calculation of EPCs.
- Collect a surface soil sample from a depth of 0 to 1 ft bgs, and collect a composited subsurface soil sample from a blended depth of 1 to 10 ft bgs (or 1 to 2 ft bgs in wetland soils), at DUs as specified in Worksheets #10 and #17, based on the preliminary screening evaluation. Specific analytes as specified in Worksheet #17 and may include SVOCs, PCBs, and metals, including Cr^{6+} and mercury. Per team agreements, depth-discrete subsurface soil sampling is not required; a composite subsurface soil sample is appropriate to assess potential risks from exposure to subsurface soil within that depth horizon.

- If Cr6+ or Hg are detected in soil during this Phase III RI filed investigation, and they pose unacceptable risks, they are considered as risk drivers for either human or ecological receptors, and they could be attributable to background conditions, then the team will consider sampling background locations where Cr^{6+} and Hg are potentially present.

- Anticipate areas of limited accessibility within selected DUs (refer to Figures 17-3 through 17-20) and design an appropriate sampling grid to avoid those areas. As described above, areas of limited accessibility are anticipated at DU01, DU03, DU05, DU08, and DU17 and appropriate sample grids have been designed. If unanticipated areas of limited accessibility are encountered during the Phase III RI field investigation (either horizontally or vertically), adjust the sampling locations as necessary to ensure collection of the minimum number of samples.

Goal 2 – Collect a representative dataset for surface water and sediment at a sitewide scale, as well as from exposure areas the vicinity of DUs that could potentially impact downgradient surface water and sediment. Calculate EPCs to quantify potential risks.

- Collect a sitewide network of sediment and surface water samples upstream of the DUs. Consider background/reference locations for revetted drainage channels, as well as background/reference locations for non-revetted drainage channels. Collect a minimum of 15 samples in background/reference sampling locations, which will be suitable for statistical evaluation and generation of sediment BTVs.

- Collect a minimum of 15samples from the near-vicinity of DUs that exhibit the potential for surface water or sediment impacts. Locations should consist of adjacent and downstream segments of drainage channels that are within or in the near-vicinity of DUs. If associated upstream samples are not already included in the background/reference surface water and sediment sampling locations, then collect local upstream samples in the near-vicinity of the DU. If sufficient water is in the drainage channel during the Phase III RI field investigation, then collect associated surface water samples at that particular sediment sampling location.

- Collect both filtered (dissolved) and unfiltered (total) surface water samples for metals (including Cr^{6+} and mercury) from both site and background locations for use during risk assessment and for refining the CSM. Filtered samples will be collected for organic parameter groups (SVOCs, PAHs, PCBs) in surface water when the turbidity is elevated (>10 NTU).

Goal 3 – Establish a representative groundwater monitoring well network and collect groundwater samples on a sitewide scale, as well as on a local scale in the vicinity of DUs that could potentially (or have been demonstrated to) have localized groundwater impacts.

- Select biased locations within the perched groundwater for additional groundwater monitoring wells on a sitewide scale. Include sufficient sitewide coverage to quantify perched groundwater flow directions and groundwater conditions across the site.

- Select biased locations for additional groundwater monitoring wells in the vicinity of DUs that could potentially (or have been demonstrated to) have localized groundwater impacts. Include sufficient coverage to assess upgradient, source area, and downgradient groundwater conditions.

- Construct all new monitoring wells with the appropriate total well depth and screen interval to enable well development and low-flow groundwater sampling per EPA guidelines.

- Collect total (unfiltered) and dissolved (filtered) groundwater samples for use in refining the groundwater CSM, with the exception of VOCs; field-filtering is not appropriate for VOCs.

Goal 4 – Collect additional physical and chemical data to support the CSM, risk assessments, and FS.

- Collect the required field parameters (pH, DO, ORP, temperature, and specific conductance) during groundwater monitoring well development and sampling per low-flow sampling guidance to assess groundwater stability prior to sampling.

- Analyze for TOC in sediment samples and hardness in surface water samples to support the ecological risk assessment.

- Collect hexavalent chromium (Cr^{6+}) data at 10% of samples analyzed for metals in all media to assess what, if any, fraction of total chromium is present in the more toxic Cr^{6+} form. The analysis of Cr^{6+} is an exercise to verify the absence of Cr^{6+}. The Cr^{6+} data can be used to generate ratios of hexavalent to total chromium, which can then be used in the HHRA and ERA, rather than defaulting to the conservative presumption that all chromium could be Cr^{6+}.

- Analyze additional geochemical parameters (pH and ORP) for samples that will be analyzed for Cr^{6+}, to validate the analytical results relative to field conditions.

- Analyze for selected geochemical and MNA parameters in groundwater to support the CSM, as well as to evaluate the potential for MNA in the FS.

- Collect physical/geotechnical characteristics of soil and groundwater, including hydraulic conductivity and soil permeability, to support potential LNAPL response actions in the FS.

11.7 Performance Criteria

The selection of performance criteria is based on potential sources of study error (i.e., field error, analytical error), methods that will be applied to reduce the potential sources of error, and an approach on how team decisions will be managed relative to potential occurrences of error.

Sources of Error

For this field program, sources of error consist of two main categories: sampling errors and measurement errors. A sampling error occurs when the sampling design, planning, and implementation do not provide for a representative range of heterogeneity at the site. A measurement error occurs when there is a performance variance from laboratory instrumentation, analytical methods, and/or operator error. EPA identifies the combination of all these errors as a "total study error" (EPA 2006). For this Phase III RI field investigation, the team has prepared this SAP to reduce (and essentially eliminate) the potential for total study error by documenting the DQOs, decision strategy, sampling design, analytical requirements, and other details, all of which provide team alignment with the study objectives and goals.

Managing Decision Error

This investigation will use decision-error minimization techniques in sampling design, sampling methodologies, and laboratory measurement of constituents of potential concern. Possible decision errors will be minimized during the Phase III RI field investigation by using the following methods:

- Use standard field sampling methodologies (as discussed in Worksheets #14, #18, and #21).
- Use applicable analytical methods and standard operating procedures (SOPs) for sample analysis by a competent analytical laboratory having state appropriate National Environmental Laboratory Accreditation Program accreditation, and be accredited through the DoD Environmental Laboratory Accreditation Program.
- Confirm analytical data to identify and control potential laboratory error and sampling error by using matrix spikes, blanks, and duplicate samples.

Decision Error

Decision errors associated with judgmental sampling are based on sample design and measurement errors. Assuming that the best possible professional judgment was used to develop the judgmental sampling plan (e.g., selection of sampling locations, depths, and analytical parameters), remaining decisions and opportunities to mitigate potential errors will be associated with field decisions on refined sampling locations and depths, managing insufficient groundwater yields or quality, managing and packaging analytical samples, and managing analytical results through the data validation process and statistical analysis to derive EPCs and conduct risk assessments. Analytical data will be considered acceptable if they meet the appropriate data validation criteria presented in Worksheet #34, 35, and 36. Estimates of the mean within a DU or exposure area will be calculated using ProUCL software to obtain a 95% upper confidence limit (UCL) on the arithmetic mean (alpha = 0.05). Data from within DUs or exposure areas will be evaluated relative to background conditions using hypothesis testing with alpha set at 0.05 to limit the potential for Type I (false positive) errors.

11.8 Analytical Laboratory Sample Management

The sample matrix, number of samples, and number and type of laboratory quality assurance and quality control (QA/QC) samples are summarized in the "Sample Details Tables" of this SAP. Details on the analytical group, sample volumes, sample container specifications, preservation requirements, and maximum holding times are identified in Worksheets #19 and #20 of this SAP.

The laboratory will provide staged electronic data deliverable (SEDD) files, as specified below, which will be compatible with the EQuiS database. Additionally, the laboratory will provide portable document format (PDF) files of the data deliverables for all project data and a hard copy of data deliverables for all results including results from secondary subcontract laboratories. The team may also consider requesting uncensored results from the laboratory as a separate electronic deliverable for selected methods. Designated samples will be used to obtain necessary subsamples for laboratory QC measurements, which includes analytical sample duplicate and sample matrix spike/matrix spike duplicate (MS/MSD). Tasks will be completed using the laboratory SOPs. AECOM will provide data validation services and verify and evaluate the usability of the data as identified in Worksheets #31 through #37.

PDF copies of all analytical data packages will be stored on CD-ROM, archived in the Administrative Record, and uploaded to the FUDSChem Database. All other data generated in the field and reports generated for the project will be stored as computer readable data files by AECOM and the native files will be provided to USACE.

11.9 Staged Electronic Data Deliverable (SEDD) File Specifications

The laboratory will provide SEDD version 5.2 Stage 2a files for the project. The SEDD files will comply with the EPA published specifications, be in extensible mark-up language (XML) and be provided on a sample delivery group (SDG) basis.

The USACE Automated Data Review (ADR) web-based program will be used for this project. AECOM will provide the contract laboratory (Eurofins Laboratories) with a project specific ADR electronic Quality Assurance Project Plan (eQAPP) for their review. The laboratory will utilize the eQAPP to verify compliance of the laboratory SEDD files prior releasing the SEDD files.

The SEDD files will consist of project and laboratory QC samples. The ADR program will check for format and content compliance. ADR will perform an automated data review of the project samples including but not limited to: holding times: sample temperature upon laboratory receipt; laboratory and field blank contamination; and accuracy and precision of laboratory control samples, MS/MSD, surrogates, field duplicates, and laboratory duplicates. ADR will produce validation outlier reports and assign qualifiers; the reports and qualifiers will be reviewed and approved by the AECOM project chemist.

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Worksheet #12.1: Measurement Performance Criteria – Field Quality Control (QC) SAMPLES

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria (MPC)
Equipment Rinsate Blank	VOCs, SVOCs, PCBs, metals/mercury, hexavalent chromium	One per 10 samples per matrix per sampling equipment	Accuracy/Bias/ Contamination	No analytes > ½ Limits of Quantification (LOQ)
Field Duplicate	VOCs, SVOCs, PCBs, metals/mercury, hexavalent chromium	One per 10 field samples	Precision	Relative Percent Difference (RPD) ≤ 30 for aqueous samples or ≤ 50 for solid samples if both results are ≥2 x LOQ
Trip Blank	VOCs	One per cooler	Accuracy/ Bias/ Contamination	No target analytes ≥ ½ LOQ (>LOQ for common laboratory contaminants), unless target analytes in field samples are > 10x those in trip blank.
Cooler Temperature Indicator	VOCs, SVOCs, Metals and Mercury (total and dissolved), PCBs, hexavalent chromium	One per cooler	Representativeness	Temperature must be above freezing and ≤ 6 ˚C.
Matrix Spike/ Matrix Spike Duplicate	VOCs, SVOCs, PCBs, metals/mercury, hexavalent chromium	One pair per 20 field samples	Accuracy/Bias/ Precision	See Worksheet #28 for percent recoveries and RPDs RPD ≤30

Notes:

(1) Collect only if non-dedicated, non-disposable equipment is used.

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Worksheet #14: Summary of Project Tasks

The following project tasks are to be performed as a part of the Camp Hero Phase III RI field investigation, as summarized below:

- Field Tasks
- Analytical Tasks
- Data Management and Review
- Report Preparation

Field Tasks

The following subsections present field tasks that will be completed as part of the Phase III RI field investigation at Camp Hero. All field tasks will be completed following the SOPs listed in Worksheet #21 and provided in Appendix I.

Personnel Qualifications – As established in the Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP), personnel mobilized to the site will meet applicable Occupational Safety and Health Administration (OSHA) training including hazardous waste operations and emergency response training, medical surveillance requirements, and First Aid/automated external defibrillator/cardiopulmonary resuscitation certification.

The Site Safety and Health Officer (SSHO) will have completed the 30-hour OSHA General Industry or Construction Industry Safety Class, as specified in Engineering Manual (EM)-385 (USACE, 2014). The SSHO will be responsible for managing, implementing, and enforcing the health and safety program in accordance with the accepted APP. The SSHO will be a competent person that can identify existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures to eliminate them.

The Site Supervisor (SS) will have completed the 8-hour OSHA SS training, as specific in EM-385. The SS will lead field operations, coordinate field activities, and act as the liaison between site and laboratory personnel, among other responsibilities. The Unexploded Ordnance (UXO) Technician II will have the appropriate level of training and experience as stated in Department of Defense Explosives Safety Board (DDESB) Technical Paper 18.

Site-Specific Training – As part of the mobilization process, site-specific training for on-site personnel will be conducted by the SSHO prior to performance of work. Site-specific training will include, but is not limited to, Ordnance Recognition Training to identify potential explosive hazards and react appropriately, by all employees and the subcontract employees. **Stop work authority will be used immediately if ordnance or Chemical Warfare Materiel (CWM) is suspected.**

Training will be provided by the SSHO and the other project staff, as required. The purpose of this training is to ensure that personnel fully understand the operational procedures and methods to be used at Camp Hero, individual duties and responsibilities, and safety and environmental concerns associated with the planned investigation activities.

Digital and paper copies of required project documents will be maintained on site for reference. Site workers, whether arriving at the start of the project or rotating on site as a substitution for another employee, will not be allowed to conduct their daily field operations without receiving site-specific training, reviewing the required documents, and signing off that they have reviewed, understood, and will follow the project SAP.

Site Coordination – In accordance with project kick-off meetings, anticipated work hours will be 0700 to 1900. All Phase II activities conducted under this RI WP will be coordinated with the Camp Hero State Park Superintendent Tom Dess to ensure activities do not impact park visitors and seasonal work restrictions. Additionally, activities under this RI WP will be coordinated with the State Historic Preservation Officer and other interested parties and stakeholders, in accordance with Section 106 of the National Historic Preservation Act of 1996, as amended and 36 CFR 800.

Site Visit – Prior to the initiation of intrusive field work, the team will conduct a site visit to mark out the locations of the discrete soil samples and lay out the sampling locations for the unbiased sampling grids. Selected locations will be marked in the field and coordinates will be recorded using a Global Positioning System (GPS) receiver capable of sub-meter accuracy (Trimble). Obstructions that limit access will be noted and contingent locations identified. The mark out of the locations will be utilized for utility clearance (described below).

Mobilization/Demobilization – The team will schedule the arrival of its workforce, and subcontracted workforce, in a manner that is most effective and designed to allow immediate productivity. Personnel mobilized to the site will meet the OSHA training and medical surveillance requirements specified in the APP. As part of the mobilization process, site-specific training for on-site personnel will be performed.

UXO Anomaly Avoidance – Based on a UXO probability analysis completed by USACE Baltimore District, it has been determined that the Camp Hero site activities have a low probability of encountering munitions and explosives of concern (MEC), except for areas H and K, which will not be entered at any point during RI field activities. Anomaly avoidance will be conducted in accordance with EM 385-1-97 during subsurface investigations. "Anomaly avoidance" is defined as the avoidance of surface MEC and any subsurface anomalies where the specific activity can be moved to another location. A UXO Technician II will conduct anomaly avoidance during RI field activities. The UXO Technician II will have the appropriate level of training and experience as stated in DDESB Technical Paper 18.

Additionally, all field personnel, including project staff, site visitors, and subcontractors, will complete Ordnance Recognition Training prior to the start of field activities. **Stop work authority will be used immediately if ordnance or Chemical Warfare Materiel (CWM) is suspected and the team leader will call 911 to notify authorities.** It should be noted that anomaly avoidance is only applicable to MEC hazards. The CWM Design Center in Huntsville will provide guidance for the potential of encountering CWM.

Brush Clearing and Rare Plant Survey – Portions of Camp Hero are significantly overgrown with vegetation, which will have to be removed to access sample locations and install permanent monitoring wells. To facilitate access, hand tools and mechanized equipment will be used to trim the overgrowth of vegetation along the site access roads and clear paths to the sampling locations. Only small shrubs and brush will be cleared; no hardwood trees. Cut brush will be left on site in the general vicinity of its generation. The vegetation will be cleared prior to the initiation of field activities.

Additionally, a botanist will survey areas needing vegetation removal prior to removal activities, to flag endangered or rare species, including the southern arrowwood. The removal of snags will be avoided, and no large a hardwood trees will be cleared, defined as a tree with greater than or equal to a 3 in diameter, to ensure protected habitat for the endangered Northern long-eared bat and preserve potential bird nesting. Clearing will be minimized to the maximum extent practicable. Also, because many sample locations are near streams, the team will take measures to avoid and minimize impacts to streams and riparian wetlands. Any ruts which may be created when crossing wet areas will be removed.

The team has also coordinated with Julie Lundgren (NY Natural Heritage Program of SUNY ESF in partnership with NYS Office of Parks, Recreation and Historic Preservation), the NYSDEC, and the United States Fish and Wildlife Services (USFWS), whom are providing guidance on the known occurrence of rare, threatened, or sensitive species in the vicinity of the RI field and appropriate protection measures. The field team will sweep the path ahead of the drill rig or other equipment at all sampling locations to check for box turtles or other significant species.

Utility and Subsurface Structure Clearance – Per AECOM-Tidewater JV and USACE policies, utility clearance is required for all intrusive work, regardless of planned intrusive depth. Prior to intrusive activities, the Site Supervisor is responsible for marking-out planned intrusive locations and contacting DigSafe per New York (Long Island) pre-notification requirements. Precautionary measures (e.g., geophysical survey, hand-digging to 5 feet, etc.) are required if utility clearance is not confirmed. Lack of confirmation can include urban locations, areas adjacent to roadways, areas not previously assessed, areas with insufficient utility information, or areas with multiple utility lines. The location of utilities will be noted and recorded during the site visits and referenced when selecting investigation locations. Utility Clearance will be conducted in accordance with *SOP 3-01: Utility Clearance* (Appendix I).

<u>Field Instrument Calibration and Quality Control</u> – Equipment, regardless of source, will be checked to ensure its completeness and operational readiness. Any equipment found damaged or defective will be returned to the point of origin, and a replacement will be secured. Instruments and equipment that require routine maintenance and/or calibration will be checked initially upon arrival and then prior to use each day, if needed to support that day's operations. See *SOP 3-20: Operation and Calibration of a PID* (Appendix I) for more details.

This system of checks ensures that the equipment is functioning properly. If an equipment check indicates that any piece of equipment is not operating correctly and field repair cannot be made, the equipment will be tagged and removed from service, and a request for replacement equipment will be placed immediately. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

<u>Community Air Monitoring</u> – Community air monitoring will be performed in accordance with the New York State Department of Health Generic Community Air Monitoring Plan (CAMP), Attachment 1A of the NYSDEC Division of Environmental Remediation-10 Technical Guidance for Site Investigation and Remediation (refer to Appendix H). Air monitoring activities will be implemented to protect the community from any potential airborne releases that could result from field activities associated with the RI or remedial action efforts as necessary (NYSDEC 2010).

The field personnel will monitor their breathing zones during project activities using a PID when working at AOCs potentially contaminated with petroleum hydrocarbons and organic solvents. An action level for respiratory protection has been established at 5 ppm as averaged over a 15-minute time period. If this limit is exceeded, work will stop and the SSHO and PM will determine how to proceed. See *SOP 3-20: Operation and Calibration of a PID* (Appendix I) for more details.

<u>Permanent Monitoring Well Installation</u> – Approximately 22 permanent monitoring wells will be installed during the Phase III RI field investigation. Monitoring wells will be installed by a driller licensed by the State of New York via sonic drilling methods. An exclusion zone will be established with cones surrounding the drilling operation. The drilling team will slip a sheet of plastic under the sonic drill rig and pull it up around the tracks to act as a containment barrier. The sonic drill will be

advanced through a tub or surface casing at the ground surface. A 4-inch core barrel and a 6-inch override casing will be utilized to core and case through to the borehole target depth. Soil within each 5-foot long core barrel will be extruded from the core barrel into a plastic sleeve. The plastic sleeve will be placed horizontally on clean plastic for logging and sampling purposes. The geologist will measure to the bottom of the boring within the 6-inch override casing to insure the inside casing is open and clear to the bottom of the borehole.

An unused 2-inch diameter milled slot PVC screen and casing will be installed to the bottom of the borehole. Sand pack will be placed in lifts as the drilling crew pulls the casing back to expose the well screen. The borehole above sand pack will be sealed with 2 feet of bentonite chips. The remaining annular space between the well casing and the 6-inch override casing from the top of the sand pack to the ground surface will be pressure grouted with a bentonite/ cement grout using a tremie pipe. The remaining 6-inch diameter sonic casing will be pulled from the ground. Vibration will be applied to the casing as it is pulled to densify and degas the grout, as well as knit the grout into the borehole wall, creating a superior seal. IDW will be contained and transported to the IDW storage area.

The SSHO will provide oversight of the subcontractor performing Sonic drilling, continuous soil core collection, and monitoring well installation. The geologists will perform soil logging in accordance with USCS and develop the monitoring wells. See *SOP 3-12: Monitoring Well Installation* for more details.

Concrete coring will be conducted prior to drilling at sampling locations situated in concrete covered areas. A 4-inch diameter core barrel will be advanced through the concrete using a stand mounted core drill to access soils for direct push sampling. The core drill will be anchored to the concrete surface either by vacuum or lag bolts during drilling. All cores will be wet drilled and water and slurry will be vacuumed as they are generated.

<u>Permanent Monitoring Well Development</u> – Permanent monitoring wells will be developed at least 24 hours after completion of well installation. Development will be completed by a combination of surging with a surge block and over-pumping with a submersible monsoon pump or Wattera pump and associated HDPE tubing, in accordance with *SOP 3-13: Monitoring Well Development* (Appendix I).

Water clarity will be visually monitored and water quality parameters, including dissolved oxygen (DO), specific conductivity (SC), ORP, pH, temperature, and turbidity will be measured using a flow-through cell per the SOP 3 24 (Water Quality Parameter Testing for Groundwater Sampling) every 5 minutes during purging to determine progress of development. The multi-parameter water quality meter will be calibrated initially and continually throughout its usage each day, as needed. A calibration check will be performed at the end of each day. Each well will be developed until the well produces clear (silt-free) water with a minimum of 3 stable water quality readings as outlined below:

- pH – within ± 0.2 units.
- DO – within ± 10%
- SC – within ± 3 percent (%).
- ORP – within ± 10 millivolts.
- Temperature – within ±1 degree Celsius.
- Turbidity – at or below 10 nephelometric turbidity unit (NTU) or within ± 10% if above 10 NTU.

If the well has slow groundwater recharge and is purged dry, the well will be considered developed when bailed or pumped dry three times in succession and the turbidity has decreased. If any water is added to the well's borehole during development or drilling, three times the volume of water added will also be removed during well development.

Reusable sampling equipment will be properly decontaminated after each use in accordance with *SOP 3-06*. Excess soil or groundwater generated will be containerized, managed and disposed of as IDW. See *SOP 3-13: Monitoring Well Development* for more details.

<u>Soil Sample Collection</u> – Soil samples will be collected from both permanent monitoring well borings, soil boring locations, and surface soil sample locations. At permanent monitoring well locations, a Sonic Drill Rig will be used to collect continuous soil cores to the target depth. At soil boring locations, a Direct Push drill rig will be used. The target depth is specified for each location in Worksheet #17 of this Phase III RI SAP. Concrete coring will be necessary prior to boring at locations with asphalt or cement. The continuous soil sampling will be accomplished by advancing a 5-ft (60-inch) coring barrel. The soil core will be screened for VOCs immediately upon opening the sleeve with a PID. Details regarding the air monitoring procedures and specific action levels are provided in the APP (AECOM-Tidewater JV, 2017c). The soil core will be logged for descriptions by a field geologist. Observations and measurements will be recorded on a soil boring log. At a minimum, depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture using the Unified Soil Classification System (USCS) will be recorded. Additional observations to be recorded may include detectable odors, groundwater or perched water depth, organic material, cultural debris, or color changes indicating staining. See *SOP 3-16: Soil and Rock Classification* and *SOP 3-17: Direct Push Sampling Techniques* for more details.

Two soil samples will generally be collected from each boring location unless otherwise specified in the RI WP Addendum. Surface soil samples are considered to be 0 to 1 ft bgs, while subsurface surface samples from unbiased DU grids will be a composite sampled from 1 to 10 ft bgs (or 1 to 2 ft bgs in wetland areas). VOC samples will be collected directly from the recently-exposed soil using a sampling corer (Encore sampler, Terra Core, or equivalent) and in accordance with *SOP 3-21: Surface and Subsurface Soil Sampling* . For other analyses, soil will be removed and transferred to a disposable, re-sealable plastic bag. The sample will then be homogenized, which will consist of mixing the soil until the sample is a uniform color, texture, and particle size. Any non-homogenous particles, organic matter, and projectile debris will be removed from the samples. After homogenization, the sample will be transferred to the appropriate sample container for laboratory analysis and placed in a cooler on ice. The required sample containers, preservatives, and holding times are specified in the QAPP (Appendix B). Sample locations will be marked with a pin flag with sample identification number, photo-documented, and recorded with a hand-held global positioning system. See *SOP 3-21: Surface and Subsurface Soil Sampling* for more details.

At locations where only surface soil samples will be collected, a clean (decontaminated) coring device will be utilized, unless soils are not cohesive, in which case certified clean, disposable sample scoops will be used. Samples will be collected via the same methodology as collecting samples from the soil cores. Non-disposable sampling equipment (i.e., hand auger) will be decontaminated between sample locations according to the procedures in Section 3.16 and *SOP 3-06: Decontamination Procedures*. An equipment blank will be collected from the hand auger for analysis of VOCs only.

<u>Soil Permeability Sample Collection (Shelby Tubes)</u> –Shelby tubes will be collected by the drillers at preselected locations as outlined in Worksheet #17. Each sample will be collected in a 3-inch outer diameter Shelby tube following American Society for Testing and Materials (ASTM) D1587/D1587M. Once the sample has been recovered, the total length will be recorded to the nearest inch and logged on the side of the tube, the borehole log, and the field book. Prior to sealing, approximately 1-inch of material will be removed from the lower end of the tube. The tubes will be sealed on both ends using either expandable packers or waxed wood discs/caps. Electrical tape will be used to seal the caps to the tube. The tubes will be stored in laboratory-provided containers to ensure the tubes are shipped in an upright position. Geotechnical parameter results do not require data validation and are therefore not listed in the analytical worksheets of this RI SAP.

<u>Surface Water and Sediment Sample Collection</u> – Co-located surface water and sediment samples will be collected from permanent, intermittent, revetted, and non-revetted stream exposure areas throughout Camp Hero. Surface water samples will be collected first at each location, prior to sediment sampling. Surface water samples should not be collected directly following a rain event. Every effort will be made to collect surface water samples after several days without precipitation

so that samples will represent baseflow conditions. Sampling will occur from downstream to upstream in locations where surface flow direction can be clearly identified; agitation of the sediment and water at shallow locations will be minimized. Physical characteristics of the sampling locations (e.g., water depth, stream width, etc.) will be documented.

All surface water samples will be analyzed for SVOCs, metals (total and dissolved), and hardness; select surface water locations may be analyzed for additional parameters, depending on the exposure area CSM (refer to Worksheet #17). Filtered surface water samples will be collected for organic parameters (SVOCs, PAHs, PCBs) when the turbidity is elevated (>10 NTU). Filtered samples will be analyzed for metals only (including Cr^{6+} [in 10% of samples] and mercury) as the dissolved phase represents the more bioavailable fraction of metals in the water column for aquatic receptors.

For unfiltered surface water samples, water will be dipped from the source or pumped from the source using a peristaltic pump with disposable tubing and placed into the appropriate laboratory-supplied bottleware containing chemical preservatives, if necessary. For filtered surface water samples, individual disposable single-sample Nalgene vacuum filters or a peristaltic pump with clean, disposable tubing and in-line filters will be used to field-filter water samples. Water will be dipped/pumped from the source and pumped through the filter into the laboratory-supplied bottleware. Each filter will be used once and discarded as non-hazardous waste.

At the end of surface water sampling, field parameters including oxidation-reduction potential, pH, specific conductance, salinity, temperature, dissolved oxygen, and turbidity will be measured with a water quality meter and recorded in the field logbook or sampling form.

Once surface water sampling is complete, sediment samples will be collected from 0 to 0.5 ft bgs using a hand-driven coring barrel with disposable acetate or PVC liner or a clean, disposable scoop. Sediment samples should target fine grained material from depositional areas. All sediment samples will be analyzed for SVOCs, metals, and total organic carbon (TOC); select locations may be analyzed for additional parameters, depending on the exposure area CSM (refer to Worksheet #17). Ten percent of the sediment samples will be analyzed for hexavalent chromium.

Material such as twigs, leaves, and stones will be removed from the samples prior to homogenization and documented in the field log or field forms. Sediment samples will be homogenized in disposable bags prior to filling laboratory-supplied sample containers. Sample jars will be labeled with the appropriate information, placed in a Ziploc bag, and stored in a cooler containing bagged ice to maintain a preservation, as appropriate.

Surface water and sediment sampling locations will be flagged in place and depicted in the field logbook for use during land surveying. Additionally, at each location the depth of water and width of channel will be recorded. Refer to *SOP 3-10 Surface Water and Liquid Sampling* and *SOP 3-22 Sediment Sampling* (Appendix I) for additional details.

Groundwater Sample Collection – Permanent monitoring wells will be sampled at least 72 hours after completion of well development, which is a deviation from the 24-hour wait period referenced in *SOP 3-14: Groundwater Sampling* (Appendix I). The "72 hour window" deviation from the SOP is being adopted in an effort to obtain representative groundwater sample, allow for recently developed wells to equilibrate, and hopefully further reduce turbidity/suspended colloidal content of groundwater samples.

Groundwater levels will be measured in each well prior to sampling using a water level meter (Solonist or equivalent). The monitoring wells will be purged using low-flow sampling techniques using a bladder or peristaltic pump and disposable tubing in accordance with SOP-3-14. Water clarity will be visually monitored and water quality parameters, including dissolved oxygen, SC, ORP, pH, temperature, and turbidity will be measured using a flow-through cell per the SOP 3 24 (Water Quality Parameter Testing for Groundwater Sampling). Readings will be collected every 5 minutes until the well produces clear (silt-free) water with a minimum of 3 stable water quality readings, as outlined above in the Well Development procedures. The multi-parameter water quality meter will be calibrated initially and continually throughout its usage each day, as needed. A calibration check will be performed at the end of each day.

Once the water quality parameters reach stabilization, samples will be collected in laboratory-supplied bottleware for the parameters established in Worksheet #17. Both total (unfiltered) and dissolved (filtered) samples will be collected for SVOCs, PCBs, and metals (including Cr^{6+} and mercury). Filtered samples will be field-filtered using a clean, disposable in-line filter. Ferrous iron (Fe^{2+}) will be analyzed in the field according to the procedures outlined below. The pH of dissolved and total Cr^{6+} samples will be adjusted according to the procedures outlined below. Non-disposable sampling equipment will be decontaminated between each well. *See SOP 3-14: Monitoring Well Sampling* and *SOP 3-24: Water Quality Parameter Testing* for more details.

Hexavalent Chromium Analysis – The pH of groundwater and surface water Cr^{6+} samples (total and dissolved) will be adjusted in the field according to the following procedures:

- If possible, pour approximately 200 mL of the sample into the Chromium 6 sample bottle (roughly 1 inch from the lip). Repeatedly invert for 1 minute.

- Using the pipette, draw a portion of preserved sample and drop onto pH paper. DO NOT dip pH paper into bottle. Only use pH strip ONCE; DO NOT reuse the pH strip.
- Read the pH. The target pH is 9.5; the acceptable pH range is 9.3 to 9.7.
  - If the pH is too high (>9.7), add a small portion of unpreserved sample, invert for a minute, retest using the pipette and pH paper.
  - If the pH is too low (<9.3), add Ammonium Hydroxide/Ammonium Sulfate buffer one drop at a time to the bottle. Add ten drops, invert for a minute, and retest using the pipette and pH paper. Document total drops added.
- Tightly close bottle lid when target pH is achieved, complete documentation, and store in cooler.

Ferrous Iron Analysis – The concentration of ferrous iron (Fe^{2+}) in filtered and unfiltered groundwater samples will be analyzed in the field using the HACH DR890 Colorimeter and HACH Method 8146 according to the procedures in *SOP 3-18 Field Analysis of Ferrous Iron Using the HACH DR890 Colorimeter and HACH Method 8146* (Appendix I). Samples will be analyzed immediately after collection because Fe^{2+} readily oxidizes to ferric iron upon exposure to air.

Hydraulic Conductivity Measurement (Slug Tests) – Hydraulic conductivity will be calculated using slug testing. The slug testing will commence at least a week after installation and a significant enough time after developing and sampling to allow the well to return to equilibrium. Hydraulic conductivity will be conducted in accordance with *SOP 3-35 In-Situ Hydraulic Conductivity Testing via Rising or Falling Head Slug Testing*.

Field Quality Control Samples — Field QC samples will be collected as part of this investigation, including field duplicates (FDs), MS/MSDs, equipment blanks (EBs), trip blanks (TBs), and temperature blanks. FD samples will be collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS and MSD samples will be collected at the rate of 5% and analyzed for the same parameters as the accompanying samples.

TBs will accompany each cooler containing samples for VOC analysis and will be analyzed for select VOCs. If non-dedicated sampling equipment is used, an EB will be collected and analyzed for whatever parameters were collected using the non-dedicated sampling equipment. A temperature blank shall be placed in each cooler to ensure that samples are preserved at or below four degrees Celsius during shipment.

Sampling Handling, Storage, and Transport – Samples will be stored on ice, packaged, and submitted to the analytical laboratory for analysis as specified in Worksheet #15. Worksheet #17 provides the soil sampling design and rationale. The combined Worksheets #18, 19, 20, and 30 provide sample identifications, necessary sample volume and preservative requirements, and hold time limitations. Samples will be quality-control checked by the Sample Manager (label correctness, completeness, etc.) and recorded on Chain-of--Custody forms. Samples will be packaged on ice and transported via overnight commercial carrier or a laboratory courier under standard chain-of-custody procedures to the laboratory. See *SOP 3-04: Sample Handling, Storage, and Shipping* (Appendix I) for additional information.

Field Documentation – Field documentation will be performed during this investigation in accordance with SOP 3-02. Sample collection information will be recorded in bound field notebooks, tablet computers, or specific field forms. A summary of field activities will be properly recorded in a bound logbook with consecutively numbered pages that cannot be removed. Logbooks will be assigned to field personnel and stored in a secured area when not in use. All entries will be written in indelible ink, and no erasures will be made. If an incorrect entry is made, striking a single line through the incorrect information will make the correction; and the person making the correction will initial and date the change. Sampling forms and other field forms will also be used to document field activities. See *SOP 3-02: Logbooks* (Appendix I) for additional information.

Borehole Abandonment – Direct push soil sample borings will be abandoned at completion of sampling activities. Borings in grass or sand will be abandoned by backfilling with bentonite chips. Borings in asphalt or concrete shall be abandoned by backfilling with bentonite chips to approximately 6 inches bgs, and the remainder of the borehole will be patched with asphalt cold patch or hydraulic concrete. The surface at each location will be restored to match the surrounding area. *See SOP 3-15: Monitoring Well and Borehole Abandonment* (Appendix I) for more details.

Equipment Decontamination — To the maximum extent possible, the team will utilize dedicated and disposable sampling equipment to avoid the potential for cross contamination of samples due to inadequate decontamination processes. The dedicated/disposable sampling equipment will include disposable polyethylene tubing, disposable gloves, and laboratory-supplied sample bottles.

Non-disposable or non-dedicated sampling equipment (e.g., bladder pumps, water level meters, water quality meters, etc.) will be decontaminated prior to sampling and between samples following AECOM SOPs. Cleaning of equipment is performed to prevent cross-contamination between samples and to maintain a clean working environment for all personnel. Decontamination will generally consist of a water rinse station to remove gross contamination (if needed), followed by a non-phosphate detergent (e.g., Liquinox) water rinse, and a rinse with de-ionized water (provided by the laboratory). For decontamination for samples collected for organics, a solvent rinse will be included (using pesticide-grade methanol or isopropyl alcohol) for non-disposable sampling equipment. Paper towels containing recycled paper content are prohibited. If smaller equipment is to be stored or transported, it will be wrapped in aluminum foil after air-drying. Decontamination activities will be performed in accordance with *SOP 3-06: Decontamination* (Appendix I).

Land Surveying – The horizontal and vertical position of soil sample locations (surficial and subsurface borings) and permanent monitoring wells will be surveyed by a state-registered surveyor to a horizontal accuracy of 0.1 ft and a vertical accuracy of 0.01 ft. These positions will be tied to a permanent benchmark located near the site, and referenced to the NAD83 (horizontal) and NAVD88 (vertical) datums. Land survey of subsurface sample locations will be conducted in accordance with applicable specifications. See *SOP 3-07: Land Surveying* (Appendix I) for more details.

Investigation-Derived Waste (IDW) Management — IDW generated during site field activities will be managed pursuant to applicable Federal, State, and local regulations and guidance, including the USEPA Management of Investigation-Derived Wastes during Site Inspections (USEPA 1992) and USACE guidance (2013). Refer to *SOP 3-05 Investigation-Derived Waste Management* (Appendix I) for procedures related to IDW management. Department of Transportation (DOT) compliant shipping containers will be used to stage IDW prior to off-site transport. Solid IDW (e.g., drill cuttings from boring/monitoring well installation that cannot be returned to the borehole of origin) will be stored in 55-gallon metal drums and/or a 10 cubic yard closed-top roll-off bin; liquid IDW (e.g., monitoring well development water, purge water, decontamination water) will be stored in frac tanks and/or 55-gallon metal drums. The Phase III RI field investigation is anticipated to generate approximately 3 to 4 tons of solid IDW and 2,000 to 3,000 gallons of liquid IDW.

The IDW containers will be properly labeled, sampled for waste characterization, and temporarily staged on-site at a designated secure location until waste characterization is completed. The IDW containers will subsequently be transported to the approved offsite disposal facility; the intended facility will confirm their acceptance of the waste prior to transport. IDW removal from the site will be documented by manifest or bill of lading prepared by the waste disposal subcontractor. Based on the team's understanding of this site and prior field investigations, only non-hazardous IDW is anticipated during this Phase III RI field investigation. Per the expectations in the HTRW Contract and Performance Work Statement (PWS) for this project, as well as per specific direction from USACE, an AECOM-Tidewater JV field representative will complete and sign the non-hazardous manifest or bill of lading on behalf of USACE. However, per discussions with USACE, if hazardous IDW is identified during this Phase III RI field investigation, then USACE will complete and sign the hazardous waste manifest per USEPA and NYSDEC requirements.

Analytical Tasks

AECOM's Project Chemist will track the samples from collection through analysis. Data deliverables will be provided by the laboratory within 15 business days of sample receipt. The laboratory will submit the Level II sample results in PDF via email. Final data deliverables will be submitted in pdf (bookmarked and searchable), and in electronic form using the SEDD version 5.2 Stage 2a format.

Analytical results from the final data deliverables will be reviewed according to the procedures in Worksheet #36. Only results from final data deliverables will be formally validated. ADR will perform an automated data review of the project samples including but not limited to: holding times: sample temperature upon laboratory receipt; laboratory and field blank contamination; and accuracy and precision of laboratory control samples, MS/MSD, surrogates, field duplicates, and laboratory duplicates. ADR will produce validation outlier reports and assign qualifiers; the reports and qualifiers will be reviewed and approved by the AECOM project chemist. The validated data will then be loaded into the AECOM database.

Report Preparation

Following the completion of data collection, laboratory analysis, and data validation, a comprehensive RI Report per CERCLA guidance will prepared. The results of the site characterization will documented in a RI Report, including the Phase I, Phase II, and Phase III RI field investigations. The RI report will present the methods used for the RI, the updated CSM resulting from the investigation, the results of the risk assessment, and a determination of whether further remedial action is needed.

Additionally, the RI Report will include the following elements:

- Restatement of program goals.
- Summary of field investigation conducted (e.g., sampling dates, soil samples collected, wells sampled, parameters analyzed, field procedures, etc.).
- Tables summarizing the samples collected and sample analytical data.
- Figures showing the layout of each sampling area, updated site features, results of geophysical surveys, soil boring locations, and summaries of pertinent analytical results.
- Data validation/QA/QC discussion.
- Deviations from the initial SAP and/or SAP modification.

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Worksheet #15.1 Reference Limits and Evaluation for Soil

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Metals by 6020A, mg/kg								
Aluminum	7429-90-5	50	ORNL (plants)	40	10	4.62	78-124	20
Antimony	7440-36-0	0.27	Eco-SSL (wildlife)	0.4	0.2	0.0982	72-124	20
Arsenic	7440-38-2	0.68	Res Soil RSL	0.8	0.4	0.1476	82-118	20
Barium	7440-39-3	330	Eco-SSL (inverts)	0.8	0.4	0.16	86-116	20
Beryllium	7440-41-7	10	ORNL (plants)	0.2	0.05	0.0216	80-120	20
Cadmium	7440-43-9	0.36	Eco-SSL (wildlife)	0.2	0.1	0.0388	84-116	20
Calcium	7440-70-2	NA	--	80	40	19.62	86-118	20
Chromium	7440-47-3	0.3	Res Soil RSL	0.8	0.2	0.118	83-119	20
Cobalt	7440-48-4	2.3	Res Soil RSL	0.2	0.1	0.0402	84-115	20
Copper	7440-50-8	28	Eco-SSL (wildlife)	0.8	0.2	0.1008	84-119	20
Iron	7439-89-6	2000	NYSDEC Sup Res SCO	40	20	6.74	81-124	20
Lead	7439-92-1	11	Eco-SSL (wildlife)	0.4	0.05	0.0292	84-118	20
Magnesium	7439-95-4	NA	--	40	10	2.36	80-123	20
Manganese	7439-96-5	180	Res Soil RSL	0.8	0.2	0.1758	85-116	20
Nickel	7440-02-0	38	Eco-SSL (plants)	0.8	0.4	0.167	84-119	20
Potassium	7440-09-7	NA	--	80	20	9.42	85-119	20
Selenium	7782-49-2	0.52	Eco-SSL (plants)	0.8	0.2	0.0874	80-119	20
Silver	7440-22-4	4.2	Eco-SSL (wildlife)	0.2	0.05	0.0236	83-118	20
Sodium	7440-23-5	NA	--	80	20	9.36	79-125	20
Thallium	7440-28-0	0.078	Res Soil RSL	0.2	0.05	0.029	83-118	20
Vanadium	7440-62-2	2	ORNL (plants)	0.2	0.1	0.0378	82-116	20
Zinc	7440-66-6	46	Eco-SSL (wildlife)	6	3	1.264	82-119	20
Mercury by SW7471B, mg/kg								
Mercury	7439-97-6	0.00051	ORNL (wildlife)	0.1	0.033	0.01	80-124	20
Chromium Speciation by SW7199, mg/kg								
Hexavalent Chromium	18540-29-9	0.3	Res Soil RSL	0.4	0.4	0.14	80-120	20
Trivalent Chromium (calculated)	16065-83-1	0.4	ORNL (inverts)	0.8	0.2	0.118	NA	--
Polychlorinated Biphenyls by SW8081A, mg/kg								
PCB-1016	12674-11-2	0.41	Res Soil RSL	0.017	0.01	0.0036	47-134	30
PCB-1221	11104-28-2	0.2	Res Soil RSL	0.017	0.01	0.0046	NA	--
PCB-1232	11141-16-5	0.17	Res Soil RSL	0.017	0.016	0.008	NA	--
PCB-1242	53469-21-9	0.041	EPA R4 (wildlife)	0.017	0.01	0.0033	NA	--
PCB-1248	12672-29-6	0.0072	EPA R4 (wildlife)	0.017	0.01	0.0033	NA	--
PCB-1254	11097-69-1	0.041	EPA R4 (wildlife)	0.017	0.01	0.0033	NA	--
PCB-1260	11096-82-5	0.24	Res Soil RSL	0.017	0.01	0.0049	53-140	30

Worksheet #15.1 Reference Limits and Evaluation for Soil

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
PCB-1262	37324-23-5	0.24	Res Soil RSL	0.017	0.01	0.0033	NA	--
PCB-1268	11100-14-4	0.24	Res Soil RSL	0.017	0.01	0.0033	NA	--
Total PCBs	PCBs	0.23	Res Soil RSL	--	--	--	NA	--
Decachlorobiphenyl (surrogate)	2051-24-3	--	--	--	--	--	45-143	--
tetrachloro-m-xylene (surrogate)	877-09-8	--	--	--	--	--	44-130	--
Volatile Organic Compound by SW8260C, mg/kg								
1,1,1,2-Tetrachloroethane	630-20-6	0.07	EPA R4 (inverts)	0.005	0.002	0.001	78-125	20
1,1,1-Trichloroethane	71-55-6	0.04	EPA R4 (inverts)	0.005	0.002	0.001	73-130	20
1,1,2,2-Tetrachloroethane	79-34-5	0.19	EPA R4 (inverts)	0.005	0.002	0.001	70-124	20
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	100	NYSDEC Sup Res SCO	0.01	0.004	0.002	66-136	20
1,1,2-Trichloroethane	79-00-5	0.15	Res Soil RSL	0.005	0.002	0.001	78-121	20
1,1-Dichloroethane	75-34-3	0.14	EPA R4 (inverts)	0.005	0.002	0.001	76-125	20
1,1-Dichloroethene	75-35-4	0.04	EPA R4 (inverts)	0.005	0.002	0.001	70-131	20
1,2,3-Trichlorobenzene	87-61-6	6.3	Res Soil RSL	0.005	0.002	0.001	66-130	20
1,2,4-Trimethylbenzene	95-63-6	0.09	EPA R4 (inverts)	0.005	0.002	0.001	75-123	20
1,3,5-Trimethylbenzene	108-67-8	0.16	EPA R4 (inverts)	0.005	0.002	0.001	73-124	20
1,4-Dioxane	123-91-1	5.3	Res Soil RSL	0.25	0.2	0.07	55-138	20
2-Butanone	78-93-3	1	EPA R4 (inverts)	0.01	0.008	0.004	51-148	20
4-Methyl-2-pentanone	108-10-1	3300	Res Soil RSL	0.01	0.008	0.003	65-135	20
Acetone	67-64-1	0.04	EPA R4 (inverts)	0.02	0.016	0.007	36-164	20
Benzene	71-43-2	0.06	NYSDEC SCL	0.005	0.002	0.0005	77-121	20
Carbon Disulfide	75-15-0	0.01	EPA R4 (inverts)	0.005	0.002	0.001	63-132	20
Carbon Tetrachloride	56-23-5	0.05	EPA R4 (inverts)	0.005	0.002	0.001	70-135	20
Chloroethane	75-00-3	1400	Res Soil RSL	0.005	0.004	0.002	59-139	20
Chloroform	67-66-3	0.05	EPA R4 (inverts)	0.005	0.002	0.001	78-123	20
cis-1,2-Dichloroethene	156-59-2	0.04	EPA R4 (inverts)	0.005	0.002	0.001	77-123	20
Cyclohexane	110-82-7	650	Res Soil RSL	0.005	0.002	0.001	67-131	20
Ethylbenzene	100-41-4	0.27	EPA R4 (inverts)	0.005	0.002	0.001	76-122	20
Isopropylbenzene	98-82-8	0.04	EPA R4 (inverts)	0.005	0.002	0.001	68-134	20
m- & p-Xylene	108383/106423	0.1	EPA R4 (inverts)	0.005	0.002	0.001	77-124	20
Methyl Acetate	79-20-9	7800	Res Soil RSL	0.005	0.004	0.002	53-144	20
Methyl Tertiary Butyl Ether	1634-04-4	0.93	NYSDEC SCL	0.005	0.002	0.0005	73-125	20
Methylcyclohexane	108-87-2	650	Res Soil RSL	0.005	0.002	0.001	66-133	20
Methylene Chloride	75-09-2	2.6	LANL (wildlife)	0.005	0.004	0.002	70-128	20
n-Butylbenzene	104-51-8	12	NYSDEC SCL	0.005	0.002	0.001	70-128	20
n-Propylbenzene	103-65-1	3.9	NYSDEC SCL	0.005	0.002	0.001	73-125	20

Worksheet #15.1 Reference Limits and Evaluation for Soil

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
o-Xylene	95-47-6	65	Res Soil RSL	0.005	0.002	0.001	77-123	20
p-Isopropyltoluene	99-87-6	0.18	EPA R4 (inverts)	0.005	0.002	0.001	73-127	20
sec-Butylbenzene	135-98-8	11	NYSDEC SCL	0.005	0.002	0.001	73-126	20
tert-Butylbenzene	98-06-6	5.9	NYSDEC SCL	0.005	0.002	0.001	73-125	20
Tetrachloroethene	127-18-4	0.06	EPA R4 (inverts)	0.005	0.002	0.001	73-128	20
Toluene	108-88-3	0.15	EPA R4 (inverts)	0.005	0.002	0.001	77-121	20
Total Xylenes	1330-20-7	0.1	EPA R4 (inverts)	0.005	0.002	0.001	78-124	20
trans-1,2-Dichloroethene	156-60-5	0.04	EPA R4 (inverts)	0.005	0.002	0.001	74-125	20
Trichloroethene	79-01-6	0.41	Res Soil RSL	0.005	0.002	0.001	77-123	20
Vinyl Chloride	75-01-4	0.059	Res Soil RSL	0.005	0.002	0.001	56-135	20
1,2-Dichloroethane-d4 (surrogate)	17060-07-0	--	--	--	--	--	71-136	--
Dibromofluoromethane (surrogate)	1868-53-7	--	--	--	--	--	78-119	--
Toluene-d8 (surrogate)	2037-26-5	--	--	--	--	--	85-116	--
Semivolatile Organic Compound by SW8270D, mg/kg								
1,1'-Biphenyl	92-52-4	0.2	EPA R4 (inverts)	0.033	0.033	0.017	40-117	20
1,4-Dichlorobenzene	106-46-7	0.88	LANL (wildlife)	0.033	0.033	0.017	31-115	20
1-Methylnaphthalene	90-12-0	18	Res Soil RSL	0.017	0.013	0.003	40-119	20
2-Chloronaphthalene	91-58-7	480	Res Soil RSL	0.033	0.013	0.007	41-114	20
2-Methylnaphthalene	91-57-6	0.41	NYSDEC Sup Res SCO	0.017	0.013	0.003	38-122	20
2-Methylphenol	95-48-7	0.1	EPA R4 (inverts)	0.033	0.033	0.017	32-122	20
3/4-Methylphenol	108394/106445	0.08	EPA R4 (inverts)	0.033	0.033	0.017	42-126	20
4-Chloro-3-methylphenol	59-50-7	630	Res Soil RSL	0.033	0.033	0.017	45-122	20
4-Chloroaniline	106-47-8	1	EPA R4 (plants)	0.067	0.067	0.033	17-106	20
Acenaphthene	83-32-9	20	NYSDEC SCL	0.017	0.013	0.003	40-123	20
Acenaphthylene	208-96-8	29	Eco-SSL (inverts)	0.017	0.013	0.003	32-132	20
Anthracene	120-12-7	6.8	EPA R4 (plants)	0.017	0.013	0.003	47-123	20
Benzaldehyde	100-52-7	170	Res Soil RSL	0.17	0.13	0.067	10-93	30
Benzo(a)anthracene	56-55-3	0.8	LANL (wildlife)	0.017	0.013	0.003	49-126	20
Benzo(a)pyrene	50-32-8	0.115	Res Soil RSL	0.017	0.013	0.003	45-129	20
Benzo(b)fluoranthene	205-99-2	1	NYCRR Res SCO	0.017	0.013	0.003	45-132	20
Benzo(g,h,i)perylene	191-24-2	18	Eco-SSL (inverts)	0.017	0.013	0.003	43-134	20
Benzo(k)fluoranthene	207-08-9	0.8	NYSDEC SCL	0.017	0.013	0.003	47-132	20
Benzoic acid	65-85-0	0.01	EPA R4 (inverts)	0.5	0.5	0.17	16-125	30
bis(2-Ethylhexyl)phthalate	117-81-7	0.02	LANL (wildlife)	0.17	0.13	0.067	51-133	20
Butylbenzylphthalate	85-68-7	0.59	EPA R4 (inverts)	0.17	0.13	0.067	48-132	20
Caprolactam	105-60-2	3100	Res Soil RSL	0.17	0.13	0.033	46-117	20

Worksheet #15.1 Reference Limits and Evaluation for Soil

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Carbazole	86-74-8	0.16	EPA R4 (inverts)	0.033	0.033	0.017	50-123	20
Chrysene	218-01-9	1	NYCRR Res SCO	0.017	0.013	0.003	50-124	20
Dibenz(a,h)anthracene	53-70-3	0.115	Res Soil RSL	0.017	0.013	0.003	45-134	20
Dibenzofuran	132-64-9	0.15	EPA R4 (inverts)	0.033	0.033	0.017	44-120	20
Diethylphthalate	84-66-2	0.23	EPA R4 (inverts)	0.17	0.13	0.067	50-124	20
Dimethylphthalate	131-11-3	38	LANL (wildlife)	0.17	0.13	0.067	48-124	20
Di-n-butylphthalate	84-74-2	0.011	LANL (wildlife)	0.17	0.13	0.067	51-128	20
Di-n-octylphthalate	117-84-0	0.21	EPA R4 (inverts)	0.17	0.13	0.067	45-140	20
Fluoranthene	206-44-0	10	EPA R4 (inverts)	0.017	0.013	0.003	50-127	20
Fluorene	86-73-7	30	NYSDEC SCL	0.017	0.013	0.003	43-125	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	NYCRR Res SCO	0.017	0.013	0.003	45-133	20
Naphthalene	91-20-3	1	EPA R4 (plants)	0.017	0.013	0.003	35-123	20
Phenanthrene	85-01-8	5.5	EPA R4 (inverts)	0.017	0.013	0.003	50-121	20
Pyrene	129-00-0	10	EPA R4 (inverts)	0.017	0.013	0.003	47-127	20
2,4,6-tribromophenol (surrogate)	118-79-6	--	--	--	--	--	39-132	--
2-Fluorobiphenyl (surrogate)	321-60-8	--	--	--	--	--	44-115	--
2-Fluorophenol (surrogate)	367-12-4	--	--	--	--	--	35-115	--
Nitrobenzene-d5 (surrogate)	4165-60-0	--	--	--	--	--	37-122	--
Phenol-d6 (surrogate)	13127-88-3	--	--	--	--	--	33-122	--
Terphenyl-d14 (surrogate)	1718-51-0	--	--	--	--	--	54-127	--
Polycyclic Aromatic Hydorcarbons by SW8270D-SIM, mg/kg								
1-Methylnaphthalene	90-12-0	18	Res Soil RSL	0.0017	0.0013	0.00067	43-111	20
2-Methylnaphthalene	91-57-6	0.41	NYSDEC Sup Res SCO	0.0017	0.0013	0.00067	39-114	20
Acenaphthene	83-32-9	20	NYSDEC SCL	0.0017	0.0013	0.00067	44-111	20
Acenaphthylene	208-96-8	29	Eco-SSL (inverts)	0.0017	0.0013	0.00033	39-116	20
Anthracene	120-12-7	6.8	EPA R4 (plants)	0.0017	0.0013	0.00033	50-114	20
Benzo(a)anthracene	56-55-3	0.8	LANL (wildlife)	0.0017	0.0013	0.00067	54-122	20
Benzo(a)pyrene	50-32-8	0.115	Res Soil RSL	0.0017	0.0013	0.00067	50-125	20
Benzo(b)fluoranthene	205-99-2	1	NYCRR Res SCO	0.0017	0.0013	0.00067	53-128	20
Benzo(g,h,i)perylene	191-24-2	18	Eco-SSL (inverts)	0.0017	0.0013	0.00067	49-127	20
Benzo(k)fluoranthene	207-08-9	0.8	NYSDEC SCL	0.0017	0.0013	0.00067	56-123	20
Chrysene	218-01-9	1	NYCRR Res SCO	0.0017	0.0013	0.00033	57-118	20
Dibenz(a,h)anthracene	53-70-3	0.115	Res Soil RSL	0.0017	0.0013	0.00067	50-129	20
Fluoranthene	206-44-0	10	EPA R4 (inverts)	0.0017	0.0013	0.00067	55-119	20
Fluorene	86-73-7	30	NYSDEC SCL	0.0017	0.0013	0.00067	47-114	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	NYCRR Res SCO	0.0017	0.0013	0.00067	49-130	20

Worksheet #15.1 Reference Limits and Evaluation for Soil

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Naphthalene	91-20-3	1	EPA R4 (plants)	0.0017	0.0013	0.00067	38-111	20
Phenanthrene	85-01-8	5.5	EPA R4 (inverts)	0.0017	0.0013	0.00067	49-113	20
Pyrene	129-00-0	10	EPA R4 (inverts)	0.0017	0.0013	0.00033	55-117	20
1-Methylnaphthalene-d10 (surrogate)	38072-94-5	--	--	--	--	--	52-110	--
Benzo(a)pyrene-d12 (surrogate)	63466-71-7	--	--	--	--	--	53-137	--
Fluoranthene-d10 (surrogate)	93951-69-0	--	--	--	--	--	56-142	--
pH by SW9045D, pH Units								
pH	PH	NA	--	0.1	0.1	0.1	--	--
Oxydation Reduction Potential by ASTM D1498, mV								
Oxydation Reduction Potential	ORP	NA	--	--	--	--	--	--

Notes:
The laboratory limits for Limit of Quantitation (LOQ), Limit of Detection (LOD), and Method Detection Limit (MDL) and the control limits for LCS/MS/MSD (laboratory control sample/matrix spike/matrix spike duplicate) were obtained from Eurofins Lancaster Laboratories (2017) and are meant to be recommended project values. The limits presented above reflect the most recently promulgated values reported by the laboratory.
[1] The highlighted PSLs are not analytically achievable; the LOD will be used as the PSL for non-detects.

mg/kg = milligrams per kilogram
mV = millivolts
NA = not available
The risk-based screening levels used as part of the PSL selection process include the following human health and ecological screening levels listed below:
(a) The lowest of the human health risk-based screening levels are taken from the following sources:
Res Soil RSL - USEPA Regional Screening Levels (RSLs) for Residential Soil that are protective of a target cancer risk of 1E-06 and a target hazard quotient of 0.1 (USEPA 2016a), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017).
The following surrogates (in parentheses) were used to derive RSLs for the following chemicals: Acenaphthylene (acenaphthene); benzo(g,h,i)perylene (pyrene); carbazole (fluorene); dimethyl phthalate (diethyl phthalate); methylcyclohexane (cyclohexane): 3/4-Methylphenol (lower of m-cresol and p-cresol); PCB-1262 (PCB-1260); PCB-1268 (PCB-1260); and phenanthrene (anthracene). The hexavalent chromium RSL was used to select limits for chromium that are protective of all forms of chromium that may be present at the site.
NYCRR Res SCO - 6 NYCRR Part 375-1 Remedial Program Residential Soil Cleanup Objectives (SCOs), Table 6.8(b) Residential values (NYCRR 2015).
NYSDEC SCL - NYSDEC CP-51 Soil Cleanup Guidance Soil Cleanup Levels (SCLs) for Gasoline and Fuel Oil, Tables 2 and 3 (NYSDEC 2010a).
NYSDEC Sup Res SCO - NYSDEC CP-51 Soil Cleanup Guidance Supplemental Residential SCOs, Table 1 (NYSDEC 2010a).
http://www.dec.ny.gov/docs/remediation_hudson_pdf/cpsoil.pdf
(b) Ecological screening values were selected from the following sources (parentheses indicate receptor to which the risk-based screening level applies):
Eco-SSL - Ecological Soil Screening Levels (Eco-SSLs) derived by USEPA according to USEPA guidance (2007). Individual Eco-SSL documents are available here - http://www.epa.gov/ecotox/ecossl/
ORNL (plants) - Efroymson, R.A., M.E. Will, G.W. Suter II and A.C. Wooten. 1997. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants: 1997 Revision, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, ES/ER/TM-85/R3.
ORNL (inverts) - Efroymson, R.A., M.E. Will and G.W. Suter II. 1997. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, ES/ER/TM-126/R2.
ORNL (wildlife) - Efroymson, R.A., G.W. Suter II, B.E. Sample, and D.S. Jones. 1997. Preliminary Remediation Goals for Ecological Endpoints,

Worksheet #15.1 Reference Limits and Evaluation for Soil

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD

Oak Ridge National Laboratory Oak Ridge, TN, ES/ER/TM-162/R2.
EPA R4 - USEPA Region 4. 2015. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment. Lowest available bird or mammal soil screening value selected for wildlife.
LANL - Los Alamos National Laboratory (LANL). 2015. Ecorisk Database, Release 3.3. September 2015. Lowest available bird or mammal value selected for wildlife.

Worksheet #15.2 Reference Limits and Evaluation for Sediment

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Metals by 6020A, mg/kg								
Aluminum	7429-90-5	25000	EPA R4	40	10	4.62	78-124	20
Antimony	7440-36-0	2	EPA R4	0.4	0.2	0.0982	72-124	20
Arsenic	7440-38-2	6.8	Res Soil RSL	0.8	0.4	0.1476	82-118	20
Barium	7440-39-3	20	EPA R4	0.8	0.4	0.16	86-116	20
Beryllium	7440-41-7	160	Res Soil RSL	0.2	0.05	0.0216	80-120	20
Cadmium	7440-43-9	1	DEC Sed	0.2	0.1	0.0388	84-116	20
Calcium	7440-70-2	NA	--	80	40	19.62	86-118	20
Chromium	7440-47-3	3	Res Soil RSL	0.8	0.2	0.118	83-119	20
Cobalt	7440-48-4	23	Res Soil RSL	0.2	0.1	0.0402	84-115	20
Copper	7440-50-8	32	DEC Sed	0.8	0.2	0.1008	84-119	20
Iron	7439-89-6	20000	EPA R4	40	20	6.74	81-124	20
Lead	7439-92-1	36	DEC Sed	0.4	0.05	0.0292	84-118	20
Magnesium	7439-95-4	NA	--	40	10	2.36	80-123	20
Manganese	7439-96-5	460	DEC Sed	0.8	0.2	0.1758	85-116	20
Nickel	7440-02-0	323	DEC Sed	0.8	0.4	0.167	84-119	20
Potassium	7440-09-7	NA	--	80	20	9.42	85-119	20
Selenium	7782-49-2	11	EPA R4	0.8	0.2	0.0874	80-119	20
Silver	7440-22-4	1	DEC Sed	0.2	0.05	0.0236	83-118	20
Sodium	7440-23-5	NA	--	80	20	9.36	79-125	20
Thallium	7440-28-0	0.78	Res Soil RSL	0.2	0.05	0.029	83-118	20
Vanadium	7440-62-2	390	Res Soil RSL	0.2	0.1	0.0378	82-116	20
Zinc	7440-66-6	120	DEC Sed	6	3	1.264	82-119	20
Mercury by SW7471B, mg/kg								
Mercury	7439-97-6	0.2	DEC Sed	0.1	0.033	0.01	80-124	20
Chromium Speciation by SW7199, mg/kg								
Hexavalent Chromium	18540-29-9	3	Res Soil RSL	0.4	0.4	0.14	80-120	20
Trivalent Chromium (calculated)	16065-83-1	43	DEC Sed	0.8	0.2	0.118	NA	--
Polychlorinated Biphenyls by SW8081A, mg/kg								
PCB-1016	12674-11-2	4.1	Res Soil RSL	0.017	0.01	0.0036	47-134	30
PCB-1221	11104-28-2	2	Res Soil RSL	0.017	0.01	0.0046	NA	--
PCB-1232	11141-16-5	1.7	Res Soil RSL	0.017	0.016	0.008	NA	--
PCB-1242	53469-21-9	2.3	Res Soil RSL	0.017	0.01	0.0033	NA	--
PCB-1248	12672-29-6	2.3	Res Soil RSL	0.017	0.01	0.0033	NA	--
PCB-1254	11097-69-1	1.2	Res Soil RSL	0.017	0.01	0.0033	NA	--

Worksheet #15.2 Reference Limits and Evaluation for Sediment

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
PCB-1260	11096-82-5	2.4	Res Soil RSL	0.017	0.01	0.0049	53-140	30
PCB-1262	37324-23-5	2.4	Res Soil RSL	0.017	0.01	0.0033	NA	--
PCB-1268	11100-14-4	2.4	Res Soil RSL	0.017	0.01	0.0033	NA	--
Total PCBs	PCBs	0.1	DEC Sed	--	--	--	NA	--
Decachlorobiphenyl (surrogate)	2051-24-3	--	--	--	--	--	45-143	--
tetrachloro-m-xylene (surrogate)	877-09-8	--	--	--	--	--	44-130	--
Semivolatile Organic Compound by SW8270D, mg/kg								
1,1'-Biphenyl	92-52-4	0.197	EPA R4	0.033	0.033	0.017	40-117	20
1,4-Dichlorobenzene	106-46-7	0.72	DEC Sed	0.033	0.033	0.017	31-115	20
1-Methylnaphthalene	90-12-0	0.446	EPA R4	0.017	0.013	0.003	40-119	20
2-Chloronaphthalene	91-58-7	4800	Res Soil RSL	0.033	0.013	0.007	41-114	20
2-Methylnaphthalene	91-57-6	0.447	EPA R4	0.017	0.013	0.003	38-122	20
2-Methylphenol	95-48-7	0.1	EPA R4	0.033	0.033	0.017	32-122	20
3/4-Methylphenol	108394/106445	0.078	EPA R4	0.033	0.033	0.017	42-126	20
4-Chloro-3-methylphenol	59-50-7	0.037	EPA R4	0.033	0.033	0.017	45-122	20
4-Chloroaniline	106-47-8	0.316	EPA R4	0.067	0.067	0.033	17-106	20
Acenaphthene	83-32-9	0.0098	DEC Sed	0.017	0.013	0.003	40-123	20
Acenaphthylene	208-96-8	0.009	DEC Sed	0.017	0.013	0.003	32-132	20
Anthracene	120-12-7	0.0119	DEC Sed	0.017	0.013	0.003	47-123	20
Benzaldehyde	100-52-7	0.462	EPA R4	0.17	0.13	0.067	10-93	30
Benzo(a)anthracene	56-55-3	0.0168	DEC Sed	0.017	0.013	0.003	49-126	20
Benzo(a)pyrene	50-32-8	0.0193	DEC Sed	0.017	0.013	0.003	45-129	20
Benzo(b)fluoranthene	205-99-2	0.0196	DEC Sed	0.017	0.013	0.003	45-132	20
Benzo(g,h,i)perylene	191-24-2	0.0219	DEC Sed	0.017	0.013	0.003	43-134	20
Benzo(k)fluoranthene	207-08-9	0.0196	DEC Sed	0.017	0.013	0.003	47-132	20
Benzoic acid	65-85-0	2.9	EPA R4	0.5	0.5	0.17	16-125	30
bis(2-Ethylhexyl)phthalate	117-81-7	360	DEC Sed	0.17	0.13	0.067	51-133	20
Butylbenzylphthalate	85-68-7	0.592	EPA R4	0.17	0.13	0.067	48-132	20
Caprolactam	105-60-2	31000	Res Soil RSL	0.17	0.13	0.033	46-117	20
Carbazole	86-74-8	0.9	EPA R4	0.033	0.033	0.017	50-123	20
Chrysene	218-01-9	0.0169	DEC Sed	0.017	0.013	0.003	50-124	20
Dibenz(a,h)anthracene	53-70-3	0.0224	DEC Sed	0.017	0.013	0.003	45-134	20
Dibenzofuran	132-64-9	0.151	EPA R4	0.033	0.033	0.017	44-120	20
Diethylphthalate	84-66-2	0.231	EPA R4	0.17	0.13	0.067	50-124	20
Dimethylphthalate	131-11-3	0.348	EPA R4	0.17	0.13	0.067	48-124	20

Worksheet #15.2 Reference Limits and Evaluation for Sediment

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Di-n-butylphthalate	84-74-2	0.22	EPA R4	0.17	0.13	0.067	51-128	20
Di-n-octylphthalate	117-84-0	0.513	EPA R4	0.17	0.13	0.067	45-140	20
Fluoranthene	206-44-0	0.0142	DEC Sed	0.017	0.013	0.003	50-127	20
Fluorene	86-73-7	0.0108	DEC Sed	0.017	0.013	0.003	43-125	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.0223	DEC Sed	0.017	0.013	0.003	45-133	20
Naphthalene	91-20-3	0.0077	DEC Sed	0.017	0.013	0.003	35-123	20
Phenanthrene	85-01-8	0.0119	DEC Sed	0.017	0.013	0.003	50-121	20
Pyrene	129-00-0	0.014	DEC Sed	0.017	0.013	0.003	47-127	20
2,4,6-tribromophenol (surrogate)	118-79-6	--	--	--	--	--	39-132	--
2-Fluorobiphenyl (surrogate)	321-60-8	--	--	--	--	--	44-115	--
2-Fluorophenol (surrogate)	367-12-4	--	--	--	--	--	35-115	--
Nitrobenzene-d5 (surrogate)	4165-60-0	--	--	--	--	--	37-122	--
Phenol-d6 (surrogate)	13127-88-3	--	--	--	--	--	33-122	--
Terphenyl-d14 (surrogate)	1718-51-0	--	--	--	--	--	54-127	--
Polycyclic Aromatic Hydorcarbons by SW8270D-SIM, mg/kg								
1-Methylnaphthalene	90-12-0	0.446	EPA R4	0.0017	0.0013	0.00067	43-111	20
2-Methylnaphthalene	91-57-6	0.447	EPA R4	0.0017	0.0013	0.00067	39-114	20
Acenaphthene	83-32-9	0.0098	DEC Sed	0.0017	0.0013	0.00067	44-111	20
Acenaphthylene	208-96-8	0.009	DEC Sed	0.0017	0.0013	0.00033	39-116	20
Anthracene	120-12-7	0.0119	DEC Sed	0.0017	0.0013	0.00033	50-114	20
Benzo(a)anthracene	56-55-3	0.0168	DEC Sed	0.0017	0.0013	0.00067	54-122	20
Benzo(a)pyrene	50-32-8	0.0193	DEC Sed	0.0017	0.0013	0.00067	50-125	20
Benzo(b)fluoranthene	205-99-2	0.0196	DEC Sed	0.0017	0.0013	0.00067	53-128	20
Benzo(g,h,i)perylene	191-24-2	0.0219	DEC Sed	0.0017	0.0013	0.00067	49-127	20
Benzo(k)fluoranthene	207-08-9	0.0196	DEC Sed	0.0017	0.0013	0.00067	56-123	20
Chrysene	218-01-9	0.0169	DEC Sed	0.0017	0.0013	0.00033	57-118	20
Dibenz(a,h)anthracene	53-70-3	0.0224	DEC Sed	0.0017	0.0013	0.00067	50-129	20
Fluoranthene	206-44-0	0.0142	DEC Sed	0.0017	0.0013	0.00067	55-119	20
Fluorene	86-73-7	0.0108	DEC Sed	0.0017	0.0013	0.00067	47-114	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.0223	DEC Sed	0.0017	0.0013	0.00067	49-130	20
Naphthalene	91-20-3	0.0077	DEC Sed	0.0017	0.0013	0.00067	38-111	20
Phenanthrene	85-01-8	0.0119	DEC Sed	0.0017	0.0013	0.00067	49-113	20
Pyrene	129-00-0	0.014	DEC Sed	0.0017	0.0013	0.00033	55-117	20
1-Methylnaphthalene-d10 (surrogate)	38072-94-5	--	--	--	--	--	52-110	--
Benzo(a)pyrene-d12 (surrogate)	63466-71-7	--	--	--	--	--	53-137	--

Worksheet #15.2 Reference Limits and Evaluation for Sediment

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Fluoranthene-d10 (surrogate)	93951-69-0	--	--	--	--	--	56-142	--
pH by SW9045D, pH Units								
pH	PH	NA	--	0.1	0.1	0.1	--	--
Total Organic Carbon by SW9060A, mg/kg								
Total Organic Carbon	TOC	NA	--	300	300	100	47-143	7
Oxydation Reduction Potential by ASTM D1498, mV								
Oxydation Reduction Potential	ORP	NA	--	--	--	--	--	--

Notes:
The laboratory limits for Limit of Quantitation (LOQ), Limit of Detection (LOD), and Method Detection Limit (MDL) and the control limits for LCS/MS/MSD (laboratory control sample/matrix spike/matrix spike duplicate) were obtained from Eurofins Lancaster Laboratories (2017) and are meant to be recommended project values. The limits presented above reflect the most recently promulgated values reported by the laboratory.

[1] The highlighted PSLs are not analytically achievable; the LOD will be used as the PSL for non-detects.

mg/kg = milligrams per kilogram
mV = millivolts
NA = not avilable
The risk-based screening levels used as part of the PSL selection process include the following human health and ecological screening levels listed below:
(a) The lowest of the human health risk-based screening levels were selected from the following sources:
Res Soil RSL - USEPA Regional Screening Levels (RSLs) for Residential Soil that are protective of a target cancer risk of 1E-06 and a target hazard quotient of 0.1 (USEPA 2016a), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017). Also, the soil cancer and non-cancer RSLs were multiplied by a factor of 10 to generate sediment RSLs.
The following surrogates (in parentheses) were used to derive RSLs for the following chemicals: Acenaphthylene (acenaphthene); benzo(g,h,i)perylene (pyrene); carbazole (fluorene); dimethyl phthalate (diethyl phthalate); methylcyclohexane (cyclohexane): 3/4-Methylphenol (lower of m-cresol and p-cresol); PCB-1262 (PCB-1260); PCB-1268 (PCB-1260); and phenanthrene (anthracene).
The hexavalent chromium RSL was used to select limits for chromium that are protective of all forms of chromium that may be present at the Site.
(b) Ecological risk-based screening levels were selected based on the following sources:
DEC Sed - New York State Department of Environmental Conservation, 2014. Screening and Assessment of Contaminated Sediment, June.
EPA R4 - USEPA Region 4. 2015. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment.

Worksheet #15.3 Reference Limits and Evaluation for Groundwater

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Metals by SW6020A, ug/l								
Aluminum	7429-90-5	2000	Tapwater RSL	200	50	23.1	84-117	20
Antimony	7440-36-0	0.78	Tapwater RSL	2	1	0.476	85-117	20
Arsenic	7440-38-2	0.052	Tapwater RSL	4	2	0.682	84-116	20
Barium	7440-39-3	380	Tapwater RSL	4	2	0.962	86-114	20
Beryllium	7440-41-7	2.5	Tapwater RSL	1	0.25	0.108	83-121	20
Cadmium	7440-43-9	0.92	Tapwater RSL	1	0.5	0.194	87-115	20
Calcium	7440-70-2	NA	--	400	200	98.1	87-118	20
Chromium	7440-47-3	0.035	Tapwater RSL	4	2	0.591	85-116	20
Cobalt	7440-48-4	0.6	Tapwater RSL	1	0.5	0.201	86-115	20
Copper	7440-50-8	80	Tapwater RSL	4	1	0.523	85-118	20
Iron	7439-89-6	600	TOGS 1.1.1	200	100	33.7	87-118	20
Lead	7439-92-1	15	Tapwater RSL	2	0.25	0.0902	88-115	20
Magnesium	7439-95-4	NA	--	200	50	11.7	83-118	20
Manganese	7439-96-5	43	Tapwater RSL	4	2	0.879	87-115	20
Nickel	7440-02-0	39	Tapwater RSL	4	2	0.846	85-117	20
Potassium	7440-09-7	NA	--	400	200	66.9	87-115	20
Selenium	7782-49-2	10	Tapwater RSL	4	1	0.437	80-120	20
Silver	7440-22-4	9.4	Tapwater RSL	1	0.25	0.118	85-116	20
Sodium	7440-23-5	NA	--	400	100	46.8	85-117	20
Thallium	7440-28-0	0.02	Tapwater RSL	1	0.25	0.159	82-116	20
Vanadium	7440-62-2	8.6	Tapwater RSL	1	0.5	0.202	86-115	20
Zinc	7440-66-6	600	Tapwater RSL	30	7.5	3.5	83-119	20
Mercury by SW7470A, ug/l								
Mercury	7439-97-6	0.063	Tapwater RSL	0.2	0.1	0.05	82-119	20
Chromium Speciation by EPA 218.6, ug/l								
Hexavalent Chromium	18540-29-9	0.035	Tapwater RSL	0.05	0.05	0.015	90-110	20
Trivalent Chromium (calculated)	16065-83-1	2200	Tapwater RSL	4	2	0.591	NA	--
Polychlorinated Biphenyls by SW8081A, ug/l								
PCB-1016	12674-11-2	0.14	Tapwater RSL	0.5	0.3	0.1	46-129	30
PCB-1221	11104-28-2	0.0047	Tapwater RSL	0.5	0.3	0.1	NA	--
PCB-1232	11141-16-5	0.0047	Tapwater RSL	0.5	0.4	0.2	NA	--
PCB-1242	53469-21-9	0.0078	Tapwater RSL	0.5	0.3	0.1	NA	--
PCB-1248	12672-29-6	0.0078	Tapwater RSL	0.5	0.3	0.1	NA	--
PCB-1254	11097-69-1	0.0078	Tapwater RSL	0.5	0.3	0.1	NA	--

Worksheet #15.3 Reference Limits and Evaluation for Groundwater

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
PCB-1260	11096-82-5	0.0078	Tapwater RSL	0.5	0.3	0.15	45-134	30
PCB-1262	37324-23-5	0.0078	Tapwater RSL	0.5	0.4	0.2	NA	--
PCB-1268	11100-14-4	0.0078	Tapwater RSL	0.5	0.32	0.16	NA	--
Total PCBs (calculated)	PCBs	0.044	Tapwater RSL	--	--	--	NA	--
Decachlorobiphenyl (surrogate)	2051-24-3	--	--	--	--	--	10-148	--
tetrachloro-m-xylene (surrogate)	877-09-8	--	--	--	--	--	33-137	--
Volatile Organic Compound by SW8260C, ug/l								
1,1,1,2-Tetrachloroethane	630-20-6	0.57	Tapwater RSL	1	0.5	0.5	78-124	20
1,1,1-Trichloroethane	71-55-6	5	TOGS 1.1.1	1	0.5	0.5	74-131	20
1,1,2,2-Tetrachloroethane	79-34-5	0.076	Tapwater RSL	1	0.5	0.5	71-121	20
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	5	TOGS 1.1.1	10	2	2	70-136	20
1,1,2-Trichloroethane	79-00-5	0.041	Tapwater RSL	1	0.5	0.5	80-119	20
1,1-Dichloroethane	75-34-3	2.8	Tapwater RSL	1	0.5	0.5	77-125	20
1,1-Dichloroethene	75-35-4	5	TOGS 1.1.1	1	0.5	0.5	71-131	20
1,2,3-Trichlorobenzene	87-61-6	0.7	Tapwater RSL	5	1	1	69-129	20
1,2,4-Trimethylbenzene	95-63-6	1.5	Tapwater RSL	5	2	1	76-124	20
1,3,5-Trimethylbenzene	108-67-8	5	TOGS 1.1.1	5	2	1	75-124	20
1,4-Dioxane	123-91-1	0.46	Tapwater RSL	250	70	70	59-139	20
2-Butanone	78-93-3	560	Tapwater RSL	10	3	3	56-143	20
4-Methyl-2-pentanone	108-10-1	630	Tapwater RSL	10	3	3	67-130	20
Acetone	67-64-1	50	TOGS 1.1.1	20	6	6	39-160	20
Benzene	71-43-2	0.46	Tapwater RSL	1	0.5	0.5	79-120	20
Carbon Disulfide	75-15-0	60	TOGS 1.1.1	5	1	1	64-133	20
Carbon Tetrachloride	56-23-5	0.46	Tapwater RSL	1	0.5	0.5	72-136	20
Chloroethane	75-00-3	5	TOGS 1.1.1	1	0.5	0.5	60-138	20
Chloroform	67-66-3	0.22	Tapwater RSL	1	0.5	0.5	79-124	20
cis-1,2-Dichloroethene	156-59-2	3.6	Tapwater RSL	1	0.5	0.5	78-123	20
Cyclohexane	110-82-7	217	VISL	5	2	2	71-130	20
Ethylbenzene	100-41-4	1.5	Tapwater RSL	1	0.5	0.5	79-121	20
Isopropylbenzene	98-82-8	5	TOGS 1.1.1	5	1	1	72-131	20
m- & p-Xylene	108383/106423	5	TOGS 1.1.1	1	0.5	0.5	80-121	20
Methyl Acetate	79-20-9	2000	Tapwater RSL	5	1	1	56-136	20
Methyl Tertiary Butyl Ether	1634-04-4	10	TOGS 1.1.1	1	0.5	0.5	71-124	20
Methylcyclohexane	108-87-2	217	VISL	5	1	1	72-132	20
Methylene Chloride	75-09-2	5	MCL	4	2	2	74-124	20

Worksheet #15.3 Reference Limits and Evaluation for Groundwater

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
n-Butylbenzene	104-51-8	5	TOGS 1.1.1	5	2	1	75-128	20
n-Propylbenzene	103-65-1	5	TOGS 1.1.1	5	2	1	76-126	20
o-Xylene	95-47-6	5	TOGS 1.1.1	1	0.5	0.5	78-122	20
p-Isopropyltoluene	99-87-6	45	Tapwater RSL	5	2	1	77-127	20
sec-Butylbenzene	135-98-8	5	TOGS 1.1.1	5	2	1	77-126	20
tert-Butylbenzene	98-06-6	5	TOGS 1.1.1	5	2	1	78-124	20
Tetrachloroethene	127-18-4	4.1	Tapwater RSL	1	0.5	0.5	74-129	20
Toluene	108-88-3	5	TOGS 1.1.1	1	0.5	0.5	80-121	20
Total Xylenes	1330-20-7	19	Tapwater RSL	1	0.5	0.5	79-121	20
trans-1,2-Dichloroethene	156-60-5	5	TOGS 1.1.1	1	0.5	0.5	75-124	20
Trichloroethene	79-01-6	0.28	Tapwater RSL	1	0.5	0.5	79-123	20
Vinyl Chloride	75-01-4	0.019	Tapwater RSL	1	0.5	0.5	58-137	20
1,2-Dichloroethane-d4 (surrogate)	17060-07-0	--	--	--	--	--	81-118	--
Dibromofluoromethane (surrogate)	1868-53-7	--	--	--	--	--	80-119	--
Toluene-d8 (surrogate)	2037-26-5	--	--	--	--	--	89-112	--
Semivolatile Organic Compound by SW8270D, ug/l								
1,1'-Biphenyl	92-52-4	0.083	Tapwater RSL	1	1	0.5	49-115	20
1,4-Dichlorobenzene	106-46-7	0.48	Tapwater RSL	1	1	0.5	29-112	20
1-Methylnaphthalene	90-12-0	1.1	Tapwater RSL	0.5	0.4	0.1	41-119	20
2-Chloronaphthalene	91-58-7	3	TOGS 1.1.1	1	1	0.4	40-116	20
2-Methylnaphthalene	91-57-6	3.6	Tapwater RSL	0.5	0.4	0.1	40-121	20
2-Methylphenol	95-48-7	93	Tapwater RSL	1	1	0.5	30-117	20
3/4-Methylphenol	108394/106445	93	Tapwater RSL	1	1	0.5	25-120	20
4-Chloro-3-methylphenol	59-50-7	140	Tapwater RSL	1	1	0.5	52-119	20
4-Chloroaniline	106-47-8	0.37	Tapwater RSL	4	4	2	33-117	20
Acenaphthene	83-32-9	20	TOGS 1.1.1	0.5	0.4	0.1	47-122	20
Acenaphthylene	208-96-8	53	Tapwater RSL	0.5	0.4	0.1	41-130	20
Anthracene	120-12-7	50	TOGS 1.1.1	0.5	0.4	0.1	57-123	20
Benzaldehyde	100-52-7	19	Tapwater RSL	5	4	1	45-111	30
Benzo(a)anthracene	56-55-3	0.002	TOGS 1.1.1	0.5	0.4	0.1	58-125	20
Benzo(a)pyrene	50-32-8	0.0251	Tapwater RSL	0.5	0.4	0.1	54-128	20
Benzo(b)fluoranthene	205-99-2	0.002	TOGS 1.1.1	0.5	0.4	0.1	53-131	20
Benzo(g,h,i)perylene	191-24-2	12	Tapwater RSL	0.5	0.4	0.1	50-134	20
Benzo(k)fluoranthene	207-08-9	0.002	TOGS 1.1.1	0.5	0.4	0.1	57-129	20
Benzoic acid	65-85-0	7500	Tapwater RSL	15	15	6	10-81	30

Worksheet #15.3 Reference Limits and Evaluation for Groundwater

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
bis(2-Ethylhexyl)phthalate	117-81-7	5	TOGS 1.1.1	5	4	2	55-135	20
Butylbenzylphthalate	85-68-7	16	Tapwater RSL	5	4	2	53-134	20
Caprolactam	105-60-2	990	Tapwater RSL	15	15	5	13-37	30
Carbazole	86-74-8	29	Tapwater RSL	1	1	0.5	60-122	20
Chrysene	218-01-9	0.002	TOGS 1.1.1	0.5	0.4	0.1	59-123	20
Dibenz(a,h)anthracene	53-70-3	0.0251	Tapwater RSL	0.5	0.4	0.1	51-134	20
Dibenzofuran	132-64-9	0.79	Tapwater RSL	1	1	0.5	53-118	20
Diethylphthalate	84-66-2	50	TOGS 1.1.1	5	4	2	56-125	20
Dimethylphthalate	131-11-3	150	Tapwater RSL	5	4	2	45-127	20
Di-n-butylphthalate	84-74-2	50	TOGS 1.1.1	5	4	2	59-127	20
Di-n-octylphthalate	117-84-0	20	Tapwater RSL	5	4	2	51-140	20
Fluoranthene	206-44-0	50	TOGS 1.1.1	0.5	0.4	0.1	57-128	20
Fluorene	86-73-7	29	Tapwater RSL	0.5	0.4	0.1	52-124	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	TOGS 1.1.1	0.5	0.4	0.1	52-134	20
Naphthalene	91-20-3	0.17	Tapwater RSL	0.5	0.4	0.1	40-121	20
Phenanthrene	85-01-8	180	Tapwater RSL	0.5	0.4	0.1	59-120	20
Pyrene	129-00-0	12	Tapwater RSL	0.5	0.4	0.1	57-126	20
2,4,6-tribromophenol (surrogate)	118-79-6	--	--	--	--	--	43-140	--
2-Fluorobiphenyl (surrogate)	321-60-8	--	--	--	--	--	44-119	--
2-Fluorophenol (surrogate)	367-12-4	--	--	--	--	--	19-119	--
Nitrobenzene-d5 (surrogate)	4165-60-0	--	--	--	--	--	44-120	--
Phenol-d6 (surrogate)	13127-88-3	--	--	--	--	--	10-71	--
Terphenyl-d14 (surrogate)	1718-51-0	--	--	--	--	--	50-134	--
Polycyclic Aromatic Hydorcarbons by SW8270D-SIM, ug/l								
1-Methylnaphthalene	90-12-0	1.1	Tapwater RSL	0.05	0.04	0.01	41-115	20
2-Methylnaphthalene	91-57-6	3.6	Tapwater RSL	0.05	0.04	0.01	39-114	20
Acenaphthene	83-32-9	20	TOGS 1.1.1	0.05	0.04	0.01	48-114	20
Acenaphthylene	208-96-8	53	Tapwater RSL	0.05	0.04	0.01	35-121	20
Anthracene	120-12-7	50	TOGS 1.1.1	0.05	0.04	0.01	53-119	20
Benzo(a)anthracene	56-55-3	0.002	TOGS 1.1.1	0.05	0.04	0.01	59-120	20
Benzo(a)pyrene	50-32-8	0.0251	Tapwater RSL	0.05	0.04	0.01	53-120	20
Benzo(b)fluoranthene	205-99-2	0.002	TOGS 1.1.1	0.05	0.04	0.01	53-126	20
Benzo(g,h,i)perylene	191-24-2	12	Tapwater RSL	0.05	0.04	0.01	44-128	20
Benzo(k)fluoranthene	207-08-9	0.002	TOGS 1.1.1	0.05	0.04	0.01	54-125	20
Chrysene	218-01-9	0.002	TOGS 1.1.1	0.05	0.04	0.01	57-120	20

Worksheet #15.3 Reference Limits and Evaluation for Groundwater

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Dibenz(a,h)anthracene	53-70-3	0.0251	Tapwater RSL	0.05	0.04	0.01	44-131	20
Fluoranthene	206-44-0	50	TOGS 1.1.1	0.05	0.04	0.01	58-120	20
Fluorene	86-73-7	29	Tapwater RSL	0.05	0.04	0.01	50-118	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	TOGS 1.1.1	0.05	0.04	0.01	48-130	20
Naphthalene	91-20-3	0.17	Tapwater RSL	0.06	0.06	0.03	43-114	20
Phenanthrene	85-01-8	180	Tapwater RSL	0.06	0.06	0.03	53-115	20
Pyrene	129-00-0	12	Tapwater RSL	0.05	0.04	0.01	53-121	20
1-Methylnaphthalene-d10 (surrogate)	38072-94-5		--	--	--	--	22-129	--
Benzo(a)pyrene-d12 (surrogate)	63466-71-7		--	--	--	--	26-137	--
Fluoranthene-d10 (surrogate)	93951-69-0		--	--	--	--	42-136	--
Volatile Headspace Gases by RSK-175, ug/l								
Ethane	74-84-0	150	Tapwater RSL	5	2	1	74-131	30
Ethene	74-85-1	150	Tapwater RSL	5	2	1	72-133	30
Methane	74-82-8	150	Tapwater RSL	6	6	3	73-125	30
Anions by SW9056A, ug/l								
Chloride	16887-00-6	NA		2000	2000	1000	87-111	15
Nitrate	14797-55-8	3200	Tapwater RSL	500	500	250	88-111	15
Nitrite	14797-65-0	200	Tapwater RSL	500	500	250	87-111	15
Sulfate	14808-79-8	NA		5000	5000	1500	87-112	15
Alkalinity by SW2320B, ug/l								
Alkalinity	ALKALINITY	NA	--	5000	5000	1700	84-110	5
Calculated Hardness by SM2340B, ug/l								
Hardness (Calculated)	HARDNESS	NA	--	200	50	33.4	NA	--
Sulfide by SM450 S2D, ug/l								
Sulfide	18496-25-8	NA	--	100	100	30	90-110	5
BIochemical Oxygen Demand by SM5210B, ug/l								
Biochemical Oxygen Demand	BOD	NA	--	2000	2000	2000	85-115	28
Chemical Oxygen Demand by EPA 410.4, ug/l								
Chemical Oxygen Demand	COD	NA	--	50000	50000	12800	82-108	9
Total Organic Carbon by SM5310C, ug/l								
Total Organic Carbon	TOC	NA	--	1000	1000	500	64-148	9

Worksheet #15.3 Reference Limits and Evaluation for Groundwater

		Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
Analyte	CAS Number	Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD

Notes:
The laboratory limits for Limit of Quantitation (LOQ), Limit of Detection (LOD), and Method Detection Limit (MDL) and the control limits for LCS/MS/MSD (laboratory control sample/matrix spike/matrix spike duplicate) were obtained from Eurofins Lancaster Laboratories (2017) and are meant to be recommended project values. The limits presented above reflect the most recently promulgated values reported by the laboratory.
[1] The highlighted PSLs are not analytically achievable; the LOD will be used as the PSL for non-detects.

ug/l = micrograms per liter
NA = not available
Ecological receptors are not exposed to groundwater so ecological risk-based screening levels were not included in the PSL selection process.
(a) The lowest of the human health risk-based screening levels were selected from the following sources:
Tapwater RSL - USEPA RSLs for Tap Water that are protective of a target cancer risk of 1E-06 and a target hazard quotient of 0.1 (USEPA 2016a), with updated PAH RSLs2017).
calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA
The following surrogates (in parentheses) were used to derive RSLs for the following chemicals: Acenaphthylene (acenaphthene); benzo(g,h,i)perylene (pyrene); carbazole (fluorene); dimethylphthalate (diethylphthalate); ethane (n-hexane); ethene (n-hexane); methane (n-hexane); methylcyclohexane (cyclohexane); 3/4-Methylphenol (lower of m-cresol and p-cresol); PCB-1262 (PCB-1260), PCB-1668 (PCB-1260); phenanthrene (anthracene); and p-isopropyltoluene (cumene).
The hexavalent chromium RSL was used to select limits for chromium that are protective of all forms of chromium that may be present at the Site.
MCL - USEPA Maximum Contaminant Levels (MCLs) (USEPA 2009).
VISL - USEPA Residential Vapor Intrusion Screening Levels (VISLs) (USEPA 2016b). Residential VISLs were derived using a target cancer risk of 1E-6, target hazard quotient of 0.1, and an average groundwater temperature of 9.2 C (per Phase II Camp Hero groundwater monitoring well data).
TOGS 1.1.1 - New York State Technical and Operational Guidance Series (TOGS), 1.1.1. Groundwater Effluent Limitations, Table 5 (Class GA), dated June 1998, January 1999 Errata, April 2000 Addendum, and June 2004 Addendum (NYDEC 1998, 1999, 2000, and 2004).

Worksheet #15.4 Reference Limits and Evaluation for Surface Water

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Metals by SW6020A, ug/l								
Aluminum	7429-90-5	100	TOGS 1.1.1 (aq)	200	50	23.1	84-117	20
Antimony	7440-36-0	5.6	NRWQC (hh)	2	1	0.476	85-117	20
Arsenic	7440-38-2	0.018	NRWQC (hh)	4	2	0.682	84-116	20
Barium	7440-39-3	220	EPA R4	4	2	0.962	86-114	20
Beryllium	7440-41-7	4	NRWQC (hh)	1	0.25	0.108	83-121	20
Cadmium	7440-43-9	0.25	NRWQC (aq)	1	0.5	0.194	87-115	20
Calcium	7440-70-2	NA	--	400	200	98.1	87-118	20
Chromium	7440-47-3	0.35	Tapwater RSL	4	2	0.591	85-116	20
Cobalt	7440-48-4	5	TOGS 1.1.1 (aq)	1	0.5	0.201	86-115	20
Copper	7440-50-8	9	NRWQC (aq)	4	1	0.523	85-118	20
Iron	7439-89-6	300	TOGS 1.1.1 (aq)	200	100	33.7	87-118	20
Lead	7439-92-1	8	TOGS 1.1.1 (aq)	2	0.25	0.0902	88-115	20
Magnesium	7439-95-4	82000	EPA R4	200	50	11.7	83-118	20
Manganese	7439-96-5	50	NRWQC (hh)	4	2	0.879	87-115	20
Nickel	7440-02-0	52	NRWQC (aq)	4	2	0.846	85-117	20
Potassium	7440-09-7	NA	--	400	200	66.9	87-115	20
Selenium	7782-49-2	4.6	TOGS 1.1.1 (aq)	4	1	0.437	80-120	20
Silver	7440-22-4	0.1	TOGS 1.1.1 (aq)	1	0.25	0.118	85-116	20
Sodium	7440-23-5	NA	--	400	100	46.8	85-117	20
Thallium	7440-28-0	0.2	Tapwater RSL	1	0.25	0.159	82-116	20
Vanadium	7440-62-2	14	TOGS 1.1.1 (aq)	1	0.5	0.202	86-115	20
Zinc	7440-66-6	120	NRWQC (aq)	30	7.5	3.5	83-119	20
Mercury by SW7470A, ug/l								
Mercury	7439-97-6	0.63	Tapwater RSL	0.2	0.1	0.05	82-119	20
Chromium Speciation by EPA 218.6, ug/l								
Hexavalent Chromium	18540-29-9	0.35	Tapwater RSL	0.05	0.05	0.015	90-110	20
Trivalent Chromium (calculated)	16065-83-1	74	NRWQC (aq)	4	2	0.591	NA	--
Polychlorinated Biphenyls by SW8081A, ug/l								
PCB-1016	12674-11-2	0.000064	NRWQC (hh)	0.5	0.3	0.1	46-129	30
PCB-1221	11104-28-2	0.000064	NRWQC (hh)	0.5	0.3	0.1	NA	--
PCB-1232	11141-16-5	0.000064	NRWQC (hh)	0.5	0.4	0.2	NA	--
PCB-1242	53469-21-9	0.000064	NRWQC (hh)	0.5	0.3	0.1	NA	--
PCB-1248	12672-29-6	0.000064	NRWQC (hh)	0.5	0.3	0.1	NA	--
PCB-1254	11097-69-1	0.000064	NRWQC (hh)	0.5	0.3	0.1	NA	--
PCB-1260	11096-82-5	0.000064	NRWQC (hh)	0.5	0.3	0.15	45-134	30

Worksheet #15.4 Reference Limits and Evaluation for Surface Water

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
PCB-1262	37324-23-5	0.000064	NRWQC (hh)	0.5	0.4	0.2	NA	--
PCB-1268	11100-14-4	0.000064	NRWQC (hh)	0.5	0.32	0.16	NA	--
Total PCBs (calculated)	PCBs	0.000074	EPA R4	--	--	--	NA	--
Decachlorobiphenyl (surrogate)	2051-24-3	--	--	--	--	--	10-148	--
tetrachloro-m-xylene (surrogate)	877-09-8	--	--	--	--	--	33-137	--
Semivolatile Organic Compound by SW8270D, ug/l								
1,1'-Biphenyl	92-52-4	0.83	Tapwater RSL	1	1	0.5	49-115	20
1,4-Dichlorobenzene	106-46-7	3	TOGS 1.1.1 (hh std)	1	1	0.5	29-112	20
1-Methylnaphthalene	90-12-0	2.1	EPA R4	0.5	0.4	0.1	41-119	20
2-Chloronaphthalene	91-58-7	10	TOGS 1.1.1 (hh gv)	1	1	0.4	40-116	20
2-Methylnaphthalene	91-57-6	4.7	TOGS 1.1.1 (aq)	0.5	0.4	0.1	40-121	20
2-Methylphenol	95-48-7	67	EPA R4	1	1	0.5	30-117	20
3/4-Methylphenol	108394/106445	53	EPA R4	1	1	0.5	25-120	20
4-Chloro-3-methylphenol	59-50-7	500	NRWQC (hh)	1	1	0.5	52-119	20
4-Chloroaniline	106-47-8	3.7	Tapwater RSL	4	4	2	33-117	20
Acenaphthene	83-32-9	20	TOGS 1.1.1 (hh gv)	0.5	0.4	0.1	47-122	20
Acenaphthylene	208-96-8	307	DEC Sed	0.5	0.4	0.1	41-130	20
Anthracene	120-12-7	20.7	DEC Sed	0.5	0.4	0.1	57-123	20
Benzaldehyde	100-52-7	57	EPA R4	5	4	1	45-111	30
Benzo(a)anthracene	56-55-3	0.0012	NRWQC (hh)	0.5	0.4	0.1	58-125	20
Benzo(a)pyrene	50-32-8	0.251	Tapwater RSL	0.5	0.4	0.1	54-128	20
Benzo(b)fluoranthene	205-99-2	0.0012	NRWQC (hh)	0.5	0.4	0.1	53-131	20
Benzo(g,h,i)perylene	191-24-2	0.439	DEC Sed	0.5	0.4	0.1	50-134	20
Benzo(k)fluoranthene	207-08-9	0.002	TOGS 1.1.1 (hh gv)	0.5	0.4	0.1	57-129	20
Benzoic acid	65-85-0	42	EPA R4	15	15	6	10-81	30
bis(2-Ethylhexyl)phthalate	117-81-7	0.32	NRWQC (hh)	5	4	2	55-135	20
Butylbenzylphthalate	85-68-7	0.1	NRWQC (hh)	5	4	2	53-134	20
Caprolactam	105-60-2	9900	Tapwater RSL	15	15	5	13-37	30
Carbazole	86-74-8	290	Tapwater RSL	1	1	0.5	60-122	20
Chrysene	218-01-9	0.002	TOGS 1.1.1 (hh gv)	0.5	0.4	0.1	59-123	20
Dibenz(a,h)anthracene	53-70-3	0.00012	NRWQC (hh)	0.5	0.4	0.1	51-134	20
Dibenzofuran	132-64-9	4	EPA R4	1	1	0.5	53-118	20
Diethylphthalate	84-66-2	50	TOGS 1.1.1 (hh gv)	5	4	2	56-125	20
Dimethylphthalate	131-11-3	1100	EPA R4	5	4	2	45-127	20
Di-n-butylphthalate	84-74-2	19	EPA R4	5	4	2	59-127	20
Di-n-octylphthalate	117-84-0	50	TOGS 1.1.1 (hh gv)	5	4	2	51-140	20
Fluoranthene	206-44-0	7.11	DEC Sed	0.5	0.4	0.1	57-128	20

Worksheet #15.4 Reference Limits and Evaluation for Surface Water

Analyte	CAS Number	Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
		Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD
Fluorene	86-73-7	39.3	DEC Sed	0.5	0.4	0.1	52-124	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.0012	NRWQC (hh)	0.5	0.4	0.1	52-134	20
Naphthalene	91-20-3	1.7	Tapwater RSL	0.5	0.4	0.1	40-121	20
Phenanthrene	85-01-8	19.1	DEC Sed	0.5	0.4	0.1	59-120	20
Pyrene	129-00-0	10.1	DEC Sed	0.5	0.4	0.1	57-126	20
2,4,6-tribromophenol (surrogate)	118-79-6	--	--	--	--	--	43-140	--
2-Fluorobiphenyl (surrogate)	321-60-8	--	--	--	--	--	44-119	--
2-Fluorophenol (surrogate)	367-12-4	--	--	--	--	--	19-119	--
Nitrobenzene-d5 (surrogate)	4165-60-0	--	--	--	--	--	44-120	--
Phenol-d6 (surrogate)	13127-88-3	--	--	--	--	--	10-71	--
Terphenyl-d14 (surrogate)	1718-51-0	--	--	--	--	--	50-134	--
Polycyclic Aromatic Hydorcarbons by SW8270D-SIM, ug/l								
1-Methylnaphthalene	90-12-0	2.1	EPA R4	0.05	0.04	0.01	41-115	20
2-Methylnaphthalene	91-57-6	4.7	TOGS 1.1.1 (aq)	0.05	0.04	0.01	39-114	20
Acenaphthene	83-32-9	20	TOGS 1.1.1 (hh gv)	0.05	0.04	0.01	48-114	20
Acenaphthylene	208-96-8	307	DEC Sed	0.05	0.04	0.01	35-121	20
Anthracene	120-12-7	20.7	DEC Sed	0.05	0.04	0.01	53-119	20
Benzo(a)anthracene	56-55-3	0.0012	NRWQC (hh)	0.05	0.04	0.01	59-120	20
Benzo(a)pyrene	50-32-8	0.251	Tapwater RSL	0.05	0.04	0.01	53-120	20
Benzo(b)fluoranthene	205-99-2	0.0012	NRWQC (hh)	0.05	0.04	0.01	53-126	20
Benzo(g,h,i)perylene	191-24-2	0.439	DEC Sed	0.05	0.04	0.01	44-128	20
Benzo(k)fluoranthene	207-08-9	0.002	TOGS 1.1.1 (hh gv)	0.05	0.04	0.01	54-125	20
Chrysene	218-01-9	0.002	TOGS 1.1.1 (hh gv)	0.05	0.04	0.01	57-120	20
Dibenz(a,h)anthracene	53-70-3	0.00012	NRWQC (hh)	0.05	0.04	0.01	44-131	20
Fluoranthene	206-44-0	7.11	DEC Sed	0.05	0.04	0.01	58-120	20
Fluorene	86-73-7	39.3	DEC Sed	0.05	0.04	0.01	50-118	20
Indeno(1,2,3-cd)pyrene	193-39-5	0.0012	NRWQC (hh)	0.05	0.04	0.01	48-130	20
Naphthalene	91-20-3	1.7	Tapwater RSL	0.06	0.06	0.03	43-114	20
Phenanthrene	85-01-8	19.1	DEC Sed	0.06	0.06	0.03	53-115	20
Pyrene	129-00-0	10.1	DEC Sed	0.05	0.04	0.01	53-121	20
1-Methylnaphthalene-d10 (surrogate)	38072-94-5	--	--	--	--	--	22-129	--
Benzo(a)pyrene-d12 (surrogate)	63466-71-7	--	--	--	--	--	26-137	--
Fluoranthene-d10 (surrogate)	93951-69-0	--	--	--	--	--	42-136	--
Calculated Hardness by SM2340B, ug/l								
Hardness (calculated)	HARDNESS	NA	NA	200	50	33.4	NA	--

Worksheet #15.4 Reference Limits and Evaluation for Surface Water

		Project Screening Levels [1]		Achievable Laboratory Limits			Precision and Accuracy Method Performance Criteria, Percent	
Analyte	CAS Number	Value	Source	LOQ	LOD	MDL	LCS/MS/MSD Recovery Limits	LCS/MS/MSD Precision Maximum RPD

Notes:
The laboratory limits for Limit of Quantitation (LOQ), Limit of Detection (LOD), and Method Detection Limit (MDL) and the control limits for LCS/MS/MSD (laboratory control sample/matrix spike/matrix spike duplicate) were obtained from Eurofins Lancaster Laboratories (2017) and are meant to be recommended project values. The limits presented above reflect the most recently promulgated values reported by the laboratory.
[1] The highlighted PSLs are not analytically achievable; the LOD will be used as the PSL for non-detects.
ug/l = micrograms per liter
NA = not available
The risk-based screening levels used as part of the PSL selection process include the following human health and ecological screening levels listed below:
(a) The lowest of the human health risk-based screening levels were selected from the following sources:
Tapwater RSL - USEPA RSLs for Tap Water that are protective of a target cancer risk of 1E-06 and a target hazard quotient of 0.1 (USEPA 2016a), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017). Also, the Tap Water cancer and non-cancer RSLs were multiplied by a factor of 10 to generate surface water RSLs.
The following surrogates (in parentheses) were used to derive RSLs for the following chemicals: Acenaphthylene (acenaphthene); benzo(g,h,i)perylene (pyrene); carbazole (fluorene); dimethylphthalate (diethylphthalate); 3/4-Methylphenol (lower of m-cresol and p-cresol); PCB-1262 (PCB-1260), PCB-1268 (PCB-1260); and phenanthrene (anthracene).
The hexavalent chromium RSL was used to select limits for chromium that are protective of all forms of chromium that may be present at the Site.
NRWQC (hh) - USEPA National Recommended Water Quality Criteria - Human Health Criteria that are protective of the consumption of water and organisms (USEPA 2015).
TOGS 1.1.1 (hh gv) - New York State TOGS, 1.1.1. Ambient Water Quality Standards and Guidance Values, Table 1 GA Guidance Values (NYDEC 1998, 1999, 2000, and 2004).
(b) Ecological risk-based screening levels were selected based on the following sources:
DEC Sed - New York State Department of Environmental Conservation, 2014. Screening and Assessment of Contaminated Sediment, June
TOGS 1.1.1 (aq) - New York State Department of Environmental Conservation, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1, June.
NRWQC (aq) - USEPA, 2009. National Recommended Water Quality Criteria. Hardness dependant criteria adjusted to default hardness of 100 mg/L as $CaCO_3$.
EPA R4 - USEPA Region 4. 2015. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment.

Worksheet #16: Project Schedule/Timeline Table

The following table presents a summary of the RI schedule, including the RI WP and Addendums , field investigations (Phases I, II, and III), and reporting schedule.

Activities	Dates		Deliverable
	Anticipated Date(s) of Initiation	Anticipated Date of Completion	
Prepare RI WP, SAP (with QAPP), and APP (with SSHP)	December 2015	July 2016	RI WP
RI Field Operations – Phase I	May 2016	June 2016	Phase I Field Investigation Report
Laboratory Analysis	July 2016	August 2016	None
RI WP Addendum – Phase II	November 2016	December 2016	RI WP Addendum – Phase II
RI Field Operations – Phase II	November 2016	December 2016	Phase II Field Investigation Report
Laboratory Analysis	December 2016	January 2016	None
RI WP Addendum SAP – Phase III	February 2017	May 2017	RI SAP – Phase III
RI Field Operations – Phase III	May 2017	June 2017	Phase III Field Investigation Report
Laboratory Analysis	June 2017	July 2017	None
Prepare RI Report	March 2017	December 2017	RI Report

Worksheet #17: Sampling Design and Rationale

17.1 Overview

This worksheet provides the proposed sampling design and rationale based on the CSMs summarized in Worksheet #10 and the DQOs established in Worksheet #11. This worksheet is supported with 4 tables (Tables 17-1 through 17-4) and 20 figures (Figures 17-1 through 17-20). The proposed field investigation is a "Phase III" RI field investigation that is specifically designed to complete the RI phase of the CERCLA process, as well as to provide data to support risk-based decisions and the subsequent sitewide FS. The results of this field investigation will be used to refine the CSMs for the individual DUs established at the site, as well as to provide a sitewide depiction of groundwater, surface water, and sediment through a representative sitewide network of groundwater monitoring wells and surface water and sediment sampling locations.

Analytical parameters have been selected based on parameters that exceed the preliminary screening evaluation (refer to Appendix E), the CSM for each DU relative to additional parameters that could be present but have not yet been analyzed, and data needs for the FS, such as geochemical and MNA parameters. For simplicity, analytical parameter groups warranting further analysis are referred to as VOCs, SVOCs, PCBs, and metals in this worksheet. Refer to Worksheet #15 for specific details on the parameter groups and specific parameters selected for this Phase III RI field investigation. Refer to Worksheet #10 for the CSM and identification of data needs, refer to Worksheet #11 for the DQOs established to achieve project objectives, and refer to Tables 17-1 through 17-4 for the specific sampling rationale and analytical parameters for each location and each medium.

Project Screening Levels (PSLs) have been selected based on potentially relevant regulatory screening values applicable to the media being sampled (soil, subsurface soil, groundwater, surface water, and sediment), and the potential exposure pathways and receptors identified for human health and ecological risk assessment (refer to Tables 10-1 through 10-4). Analytical requirements to achieve project objectives and support the quantification of potential risks are detailed in Worksheet #15. The proposed locations of samples to be collected as part of this Phase III RI field investigation are shown on Figures 17-1 through 17-20. The following subsections provide the specific sampling design and rationale for the selection of sampling locations, depths, and distribution.

17.2 Field Measurements and Data Collection

Field measurements and data collection will consist of observations and measurements, such as geologic logs, ambient air measurements, low-flow sampling parameters, recording of GPS coordinates, and recording of survey data. These observations and measurements will be documented in the field, organized, stored, and uploaded into the project folders and database (as required). Senior review of recorded information will be conducted and sample information will be transcribed into a field logbook, tablet computer, and/or onto field logs and datasheets.

Measurement devices will be calibrated prior to use and per the required periodic frequency dictated by the equipment manufacturer/vendor. Devices are expected to include a PID, hand-held global positioning system (GPS unit), water quality meters, and dust meters.

17.3 Unbiased Sampling Grid Approach

The prior phases of this RI consisted of biased discrete sampling within potential source areas to support the nature and extent of site impacts, define general locations of impacted media, conduct a preliminary screening evaluation, and select parameters for further assessment. With the completion of the preliminary screening evaluation (Appendix E), the team has identified potential risk exposure scenarios and pathways and the need to generate EPCs. A total of 21 AOCs, plus 6 segments of the WDS AOC, warrant further assessment based on the results of the preliminary screening evaluation (Appendix E). Contiguous AOCs warranting additional sampling were grouped into 18 geometric DUs for the Phase III investigation. The team will be implementing an unbiased sampling grid approach (different from the majority of prior investigation phases) to generate robust EPCs for the selected DUs and associated exposure areas and depths. The sampling design for an unbiased sampling grid can consist of an array of discrete samples or an ISM technique. In either case, the resulting EPCs for each DU will provide reasonable values with which to compare to risk-based screening criteria and complete risk assessments under CERCLA.

For this project, the team has elected to collect discrete samples rather than applying ISM techniques. Both approaches would provide data with which to calculate EPCs and quantify potential human health and ecological risks. An ISM approach, however, may not differentiate site impacts within each DU because only blended samples from each DU would be analyzed by the laboratory. The differentiation of site impacts within each DU is required to refine the nature and extent of contamination during the RI, as well as to define more precise boundaries of potential response actions during the FS, if warranted. In addition, the background datasets and resulting BTVs for soil that were generated for Camp Hero are based on discrete sampling. It would be inappropriate to compare ISM-based site results to discrete-based BTVs.

For these reasons, the sampling design for this Phase III RI field investigation will include an unbiased grid of discrete samples, with a sample size of a minimum of 15 samples per media, per DU. This approach will provide data for EPC calculations, as well as allow for comparisons to the existing BTVs. It will also further define the specific areas within DUs that pose impacts, and provide DU-specific datasets for use in assessing contaminant fate and transport, conducting the FS, and supporting site response actions. Consistent with team decisions, a minimum of 15 samples will be collected and analyzed for each DU to calculate EPCs for impacted site media. Also consistent with team decisions, DUs are established as geometric exposure areas, either 0.5 acres or 1 acre in size to best reflect the respective CSMs and expected distribution of site impacts. As shown on Figures 17-3 through 17-20, unbiased sampling grids within the DUs will consist of 16 sampling locations for each DU, greater than the 15 point minimum sample size to generate robust and representative EPCs for each of the DUs. Refer to the media-specific text provided in this worksheet for further details on the sampling design for each medium.

17.4 Derivation of Exposure Point Concentrations

EPCs will be calculated for surface and subsurface soil, groundwater, surface water, and sediment. Calculated EPCs will be equal to the 95% UCL on the arithmetic mean concentration or the maximum concentration, whichever is lower (USEPA, 2002c).

The most current version of ProUCL available at the time the risk assessments are started will be used to calculate the ProUCL-recommended 95% UCL. Consistent with the recommendations presented in the ProUCL guidance (USEPA, 2015c) regarding minimum sample size and frequency of detection, UCLs will be calculated where at least 10 samples and at least 6 detects are available. When the minimum sample size and number of detects are not met for a dataset, or if the UCL is greater than the maximum detected concentration, the maximum detected concentration will be used as the EPC.

Soil EPCs will be calculated for each individual DU and may also be calculated on a sitewide or a localized basis, if needed, to evaluate potential human or ecological exposures. Future excavation activities may result in the subsurface soil being brought to the surface and "mixed" with the surface soil. Therefore, total soil (0 to 10 ft bgs) EPCs for human health will be calculated by combining the surface and subsurface soil data sets for each COPC. The total soil EPC will be calculated as a volume-weighted EPC that accounts for the different sampling depths for the surface (0 to 1 ft bgs) and subsurface (1 to 10 ft bgs) horizons. A volume-weighted total soil 95% UCL will be derived by calculating separate surface soil and subsurface soil UCLs within a DU and adjusting them by a factor of 0.1 (10%) and 0.9 (90%), respectively.

For eight DUs, the preliminary screening evaluation (Appendix E) indicated that concentrations in the subsurface horizon were below residential screening levels and BTVs and did not warrant further sampling. Therefore, in those DUs, the un-biased sampling grid will only represent samples from the 0 to 1 ft bgs horizon and an alternate approach for the total soil EPC will be warranted. Based on the CSMs and the initial screening results, it is anticipated that the surface soil will be more contaminated than the sub-surface soil in these DUs. A conservative initial estimate of the total soil exposure for the construction worker and resident will be evaluated assuming that the 0 to

1 ft bgs EPC is representative of total soil. If no unacceptable risks are identified with this evaluation, then no additional evaluation is warranted. If unacceptable risks are identified, additional evaluation will be conducted considering the available Phase I subsurface soil data and the associated uncertainties will be discussed in the HHRA.

Surface water and sediment EPCs may be calculated on an exposure area-basis or may be calculated for a particular stream channel (e.g., primary north-south channel and tributaries) or stream type (e.g., channels with and without wooden revetments).

Groundwater EPCs will be calculated using data collected from the sitewide well network. In general, one round of data will be available from each monitoring well. The exception will be for DU01 which will have two rounds of data available for the determination of EPCs. Groundwater data from each well will be individually evaluated to identify COPCs and each well will be evaluated separately in the HHRA. The team may also elect to calculate EPCs for localized sets of monitoring wells to assess potential AOC-related impacts (e.g., petroleum at Building 203) or on a site-wide basis.

17.5 Surface Soil Sampling

For each DU, the team has established a uniform 0.5 to 1 acre geometric exposure area to encompass impacted surface soil identified through prior investigations and the preliminary screening evaluation. Within each DU boundary, surface soil samples will be collected from an unbiased grid to develop a representative surface soil dataset, which will be suitable for statistical evaluation and calculation of EPCs. The depth of surface soil samples will be 0 to 1 ft bgs, which is consistent with the potential human health and ecological exposure pathways and receptors associated with surface soil (refer to Tables 10-1 through 10-4). The team has identified a minimum of 15 surface soil samples as the appropriate number of unbiased grid samples to be sent for laboratory analysis. This range of samples is expected to generate a robust and representative dataset for each of the DUs. Relative to presenting and implementing the sampling grids, the team is proposing 16 evenly spaced sampling locations for each DU.

Inaccessible areas are expected to occur within selected DUs (refer to Figures 17-3 through 17-20). The sampling grid will be designed to avoid those areas. If unanticipated inaccessible areas are encountered during the Phase III RI field investigation, the specific sampling locations will be adjusted as necessary to ensure collection of the minimum required set of samples.

Analytical parameters for surface soil will vary by DU based on the parameters that exceeded the preliminary screening evaluation (refer to Appendix E), and the CSM for each DU relative to additional parameters that could be present but have not yet been analyzed. Cr^{6+} will be analyzed in 10% of samples analyzed for metals to assess what, if any, fraction of total chromium is present in the more toxic Cr^{6+} form. Additional parameters for surface soil samples will include pH and ORP for samples that will be analyzed for Cr^{6+}, to validate the analytical results relative to field conditions. Refer to Table 10-5 for a summary of data needs for each DU, and refer to the sampling rationale table, Table 17-1, for more specific analytical details relative to the surface soil sampling design.

17.6 Subsurface Soil Sampling

At DUs warranting additional subsurface soil sampling based on the preliminary screening evaluation (Appendix E), the same 0.5 to 1 acre geometric exposure area established for surface soil will be used for the subsurface soil sampling grid. The team's objective is to provide both surface and subsurface soil data from the same exposure area for use in cumulative risk assessment calculations, as well as for total soil (combined surface and subsurface soil) quantification if desired.

At each subsurface soil sampling location, the entire 1 to 10 ft bgs subsurface depth horizon (or 1 to 2 ft bgs in wetland areas) will be composited for laboratory analysis. Per team agreements, depth-discrete subsurface soil sampling is not required; a composite subsurface soil sample is appropriate to assess potential risks from exposure to subsurface soil within that depth horizon (refer to Tables 10-1 through 10-4). Similar to the surface soil sampling design, the team is proposing 16 evenly spaced sampling locations for DUs warranting subsurface soil sampling. This range of samples is expected to generate a robust and representative dataset for each of the DUs.

Also similar to the surface soil sampling design, areas of limited accessibility are expected to occur within selected DUs (refer to Figures 17-3 through 17-20). The sampling grid will be designed to avoid those areas. If unanticipated areas of limited accessibility are encountered during the Phase III RI field investigation (either horizontally or vertically due to steep terrain, boulders or other structural impedances), the specific sampling locations will be adjusted as necessary to ensure collection of the minimum required set of samples, as described in Worksheet #11 (Section 11.5).

Analytical parameters for subsurface soil will vary by DU based on the parameters that exceeded the preliminary screening evaluation (refer to Appendix E), the CSM for DUs warranting subsurface soil sampling relative to additional parameters that could be present but have not yet been analyzed, and data needs for the FS, such as geochemical parameters. Cr^{6+} will be analyzed in 10% of samples analyzed for metals to assess what, if any, fraction of total chromium is present in the more toxic Cr^{6+} form. Additional parameters for subsurface soil samples will include pH and ORP for samples that will be analyzed for Cr^{6+}, to validate the analytical results relative to field conditions.

Additionally, the field data collection requirements at DU01 include analysis of soil permeability to support the evaluation of potential LNAPL response actions. The data collection requirements were developed based on review of guidance documents EM 1110-1-4010 Multi-Phase Extraction (USACE, June 1999) and Evaluating LNAPL Remedial Technologies for Achieving Project Goals (ITRC, December 2009). Three representative core samples (Shelby tubes) of subsurface soils (2 from the silty-sand, perched water bearing soil zone and 1 from a clay unit) will be submitted for laboratory analysis of soil permeability. In the event that an LNAPL response action is part of the selected remedy at DU01, additional testing can be considered during a pre-design investigation (PDI) or pilot-scale treatability study during the post-Decision Document (DD) implementation phase of the CERCLA process. Geotechnical parameters will not require data validation so are not included in the analytical worksheets. Refer to Table 10-5 for a summary of data needs for each DU, and refer to the sampling rationale table, Table 17-1 for more specific analytical details relative to the subsurface soil sampling design.

17.7 Surface Water and Sediment Sampling

The team will collect a representative dataset for surface water and sediment at a sitewide scale, as well as from exposure areas in the vicinity of DUs that could potentially impact downgradient surface water and sediment. The objective of this sampling is to provide a dataset for use in calculating EPCs to quantify potential risks and to assess the nature and extent of potential site impacts within both revetted and non-revetted drainage channels. A sitewide network of sediment and surface water samples will also be collected upstream of the DUs . These locations are within revetted drainage channels, as well as within non-revetted drainage channels. The team will collect approximately 30 samples from sitewide upstream locations (15 from revetted channels and 15 from non-revetted channels), which will be suitable for statistical evaluation and generation of surface water and sediment BTVs. The proposed surface water and sediment sampling locations for the Phase III RI field investigation are shown on Figure 17-1.

For DUs that could potentially impact downgradient surface water and sediment, the team will collect samples within exposure areas along a linear stretch of the nearby drainage channel, with a minimum of 15 samples per exposure area, spanning the upstream, adjacent, and downstream portions of the channel relative to the nearest DU. In several locations (refer to Figure 17-1), upstream surface water and sediment samples will be further upstream of the DU, as part of the sitewide background/reference sampling locations. Similar to all planned surface water and sediment sampling locations, if sufficient water is in the drainage channel during the Phase III RI field investigation, then the team will collect associated surface water samples at that particular sediment sampling location. Otherwise, only sediment will be collected from that location.

Analytical parameters for surface water and sediment will be consistent for sitewide background/reference sampling locations, but may vary by DU based on the parameters that exceeded the preliminary screening evaluation (refer to Appendix E), and the CSM for each DU relative to additional parameters that could be present but have not yet been analyzed. Both total (unfiltered) and dissolved (filtered) samples will be collected for metals (including Cr^{6+} and mercury) at all surface water locations. Filtered surface water samples will also be collected for organic parameters (SVOCs, PAHs, PCBs) at locations where the surface water turbidity is elevated (>10 NTU). Cr^{6+} will be analyzed in 10% of samples analyzed for metals to assess what, if any, fraction of total chromium is present in the more toxic Cr^{6+} form. Additional geochemical parameters will include hardness for surface water and TOC for sediment, to support the ecological risk assessment, and pH and ORP for samples that will be analyzed for Cr^{6+}, to validate the analytical results relative to field conditions. Refer to Table 10-5 for a summary of data needs on a sitewide basis and for each exposure area, and refer to the sampling rationale table, Table 17-2 for more specific analytical details relative to the surface water and sediment sampling design.

17.8 Groundwater Sampling

Existing groundwater monitoring wells were installed at 15 background locations, as well as 6 locations in the vicinity of DU01 (Former Building 203). To achieve project objectives, an expanded network of groundwater monitoring wells will be established to collect groundwater samples on a sitewide scale, as well as on a local scale in the vicinity of DUs that could potentially (or have been demonstrated to) have localized groundwater impacts.

The team will select biased locations in perched groundwater for additional groundwater monitoring wells on a sitewide scale, as well as at a DU-specific scale. This will include sitewide sufficient coverage to quantify perched groundwater flow directions and groundwater conditions across the site. The rationale for the location and construction of each proposed monitoring well is provided on Table 17-3, and the design of the expanded groundwater monitoring well network (existing and proposed wells) is shown on Figure 17-2. The rationale for the analytical sampling protocol at each proposed monitoring well is provided on Table 17-4.

Each new well will be constructed with the appropriate total well depth and screen interval to enable well development and low-flow groundwater sampling per EPA guidelines. Both total (unfiltered) and dissolved (filtered) samples will be collected for SVOCs, PCBs, and metals (including Cr^{6+} and mercury), if collected. It is not appropriate to field-filter samples for VOCs. Fe^{2+} will be analyzed in the field. Refer to Worksheet #14 for groundwater sampling procedures and to the groundwater sampling rationale table, Table 17-4, for more groundwater specific analytical details.

All existing and new groundwater monitoring wells will be sampled, with the exception of the 15 background wells that were previously sampled to generate groundwater BTVs. This includes re-sampling the 6 wells at DU01, Former Building 203 Area, for a second round of groundwater data associated with known petroleum impacts in that area. Groundwater levels will be measured at all existing and new groundwater monitoring wells, including the 15 background wells, to support the groundwater flow evaluation and mapping.

Analytical parameters for groundwater will be consistent for sitewide groundwater monitoring wells, but may vary for wells in the near vicinity of selected DUs based on the parameters that exceeded the preliminary screening evaluation (refer to Appendix E), and the CSM for each DU relative to additional parameters that could be present but have not yet been analyzed. As indicated in the subsurface soil sampling design section, AOCs AST 35/FPH, STB, and MP revealed potential petroleum impacts during grab groundwater sampling. As such, groundwater monitoring wells will be installed in these areas for further field confirmation of the presence or absence of site impacts. Groundwater samples will be analyzed for the same parameters as selected for the petroleum-related DUs (e.g., DU01, Former Building 203 Area).

Additionally, the field data collection requirements at DU01 include analysis of hydraulic conductivity to support potential LNAPL response actions and preliminary remedial technology screening. The data collection requirements were developed based on review of guidance documents EM 1110-1-4010 Multi-Phase Extraction (USACE, June 1999) and Evaluating LNAPL Remedial Technologies for Achieving Project Goals (ITRC, December 2009). Hydraulic conductivity will be calculated using slug testing at five wells within the suspected dissolved-phase plume associated with the LNAPL at DU01.

Cr^{6+} will be analyzed in 10% of samples analyzed for metals to assess what, if any, fraction of total chromium is present in the more toxic Cr^{6+} form. Additional geochemical parameters will include pH and ORP for samples that will be analyzed for Cr^{6+}, to validate the analytical results relative to field conditions. Additionally, a subset of groundwater monitoring wells (approximately 20%) will be selected for analysis of an expanded parameter list to assess the potential for MNA, potential for specific chemical oxidation states, and potential fate and transport properties. These additional parameters will consist of biochemical oxygen demand, total oxygen demand, total organic carbon, Fe^{2+} (field analysis), chlorides, sulfates and sulfides, nitrates and nitrites, alkalinity, methane, ethane, and ethene. Calcium, potassium, and sodium will also be included to support this data need; however, these compounds are already included in the groundwater sampling list of parameters as part of metals analysis. Refer to Table 10-5 for a summary of data needs on a sitewide basis and for each DU, and refer to the sampling rationale table, Table 17-4 for more specific analytical details relative to the groundwater sampling design.

Worksheet #18: Sampling Locations and Methods/SOP Requirements Table

The soil, groundwater, sediment, and surface water sampling locations are presented in Worksheet #17, with associated tables and figures. See Worksheet #19 for additional details on analytical methods and SOPs. See Worksheet #21 for additional details on project sampling procedures including SOPs.

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Worksheet #19: Analytical SOP Requirements Table

Worksheet #19 is used to provide the project-specific sample containers, preservation, and holding time requirements. Sample containers will be certified pre-cleaned according to EPA protocols. The purity of preservation chemicals will be guaranteed by the manufacturer.

Field sampling personnel will obtain sample containers from vendors who specialize in environmental sampling supplies and will inspect them prior to use. Containers that have not been pre-cleaned according to EPA protocols or do not meet the requirements of Worksheet #19 will not be used and will be discarded. Each sample will be collected into a new, unused container.

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers (Number, Size, and Type)	Preservation Requirements (Chemical, Temperature, Light Protected)	Maximum Holding Time (Preparation/ Analysis)
Solid	VOCs	SW-846 8260C; 21-4	TerraCore samplers plus 3 X 40 mL Glass	Methanol, DI water, and/or Sodium Bisulfate; 2-6C	14 days
		SW-846 8260C; 21-3	60 ml glass jar, no headspace	None, 2-6C	14 days to analysis
	SVOCs	SW-846 8270C/D; 26-1,26-2	100g glass; 30 g	None, 2-6C	40 days
	SVOCs SIM	SW-846 8270C/D; 26-3	100g glass; 30 g	None, 2-6C	40 days
	SVOCs TCLP	SW-846 8270C/D; 26-1,26-2	100g glass; 30 g	None, 2-6C	7 days to prep/40 days to analysis
	Polychlorinated biphenyls	SW-846 8082A; 24-10	500 mL Glass; 30 g	None, 2-6C	40 days
	Metals	SW-846 6010BC; 22-1, SW-846 6020A; 22-3	100 g Glass	None, 2-6C	6 months
	Mercury	SW-846 7471A/B; 22-2	100 g Glass	None, 2-6C	28 days
	Metals TCLP, SPLP	SW-846 6010B/C; 22-1,	200 g Glass	None, 2-6C	6 months
	Mercury TCLP, SPLP	SW-846 7471A/B; 22-2	200 g Glass	None, 2-6C	28 days
	Hexavalent Chromium, IC	SW-846 7199; 29-34	100 g Glass	Cool, 6C	7 days

Worksheet #19: Analytical SOP Requirements Table (Continued)

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference	Containers (Number, Size, and Type)	Preservation Requirements (Chemical, Temperature, Light Protected)	Maximum Holding Time (Preparation / Analysis)
Solid	Total Organic Carbon (TOC)	SW-846 9060A; 29-24	20 g Glass	Cool, 6C	28 days
	Flashpoint	SW-846 1010A; 29-42	1 x 250 ml	NA	NA
	Reactive Sulfide	SW-846 9034; 29-2	100 g Glass	Cool, 6C	NA
	Reactive Cyanide	SW-846 9012A modified; 29-39	100 g Glass	Cool, 6C	NA
	pH	SW-846 9045D modified; 29-22	50 g Glass	Cool, 6C	NA
	Corrosivity	SW-846 Chapter 7; 29-22	50 g Glass	Cool, 6C	NA
	Ignitability	40 CFR 261.21; 29-19	100 g Glass	Cool, 6C	NA
Water	VOCs	SW-846 8260C; 21-3	3 x 40 mL Glass	HCl or None, 2-6C	14 days preserved; 7 days not preserved
	SVOCs	SW-846 8270C/D; 26-1,26-2	2 x 250 ml Amber glass; 250 ml	None, 2-6C	40 days
	SVOCs SIM	SW-846 8270/C/D SIM; 26-3	2 x 250 ml Amber glass; 250 ml	None, 2-6C	40 days
	SVOCs TCLP	SW-846 8270C/D; 26-1,26-2	2 x 250 ml Amber glass; 250 ml	None, 2-6C	7 days to prep/40 days to analysis
	Polychlorinated biphenyls	SW-846, 8082A; 24-7	2 x 250 ml Amber glass; 250 ml	None, 2-6C	40 days
	Metals	SW-846 6010BC; 22-1, SW-846 6020A; 22-3	250 mL plastic	HNO3, 2-6C	6 months
	Mercury	SW-846 7470A; 22-2	250 mL plastic	HNO3, 2-6C	28 days

Worksheet #19: Analytical SOP Requirements Table (Continued)

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers (Number, Size, and Type)	Preservation Requirements (Chemical, Temperature, Light Protected)	Maximum Holding Time (Preparation/ Analysis)
Water	Metals TCLP, SPLP	SW-846 6010B/C; 22-1,	1 liter Glass	None, 2-6C	6 months
	Mercury TCLP, SPLP	SW-846 7470A; 22-2	1 liter Glass	None, 2-6C	28 days
	Hexavalent Chromium, low-level	EPA 218.6; 29-33	250 mL Plastic/Glass	Cool, 6C NH4OH/(NH4)2SO4	28 days
	Anions: Chloride, Nitrate, Nitrite, Sulfate	SW-846 9056A; 29-46	2 x 40 mL glass vials	Cool, 6C	48 hour (nitrate & nitrite); 28 days
	Total Organic Carbon	SM5310C-2000; 29-7	2 x 40 mL amber glass vial	Cool, 6C, H_3PO_4 to pH <2	28 days
	Alkalinity	SM 2320B-1997 or EPA 310.1; 29-26	250 mL plastic or glass bottle	Cool, 6C	14 days
	Sulfide (colorimetric)	SM4500 S_2D/ EPA 376.2; 29-70	250 mL glass bottle	Cool, 6C, no headspace, NaOH, Zn Acetate	7 days
	Volatile Headspace Hydrocarbons	SW-846 8015B/RSK-175; 32-7	2 x 40mL glass vials	HCL to pH<2; Cool, 6C	14 days
	Biochemical Oxygen Demand	SM5210B or EPA 405.1; 29-43	1000 ml Plastic/Glass	Cool, 6C	48 hours
	Chemical Oxygen Demand	EPA 410.4; 29-50	100 ml Plastic/Glass	Cool, 6C, H_2SO_4 to pH <2	28 days

Notes:
* Laboratory specific analytical SOP
[1] The reference analytical methods associated with these SOPs can be found in Worksheet #23
[2] Maximum holding time is calculated from the time the sample is collected to the time the sample is prepared/extracted.

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Worksheet #20: Field Quality Control Sample Summary Table

Matrix	Analytical Group	Analytical and Preparation SOP Reference[1]	No. of Field Duplicate Pairs	No. of MS/MSD
Aqueous	SVOCs and SVOCs SIM	8270D_26-2	1 per 10 samples	1 per 20 samples
Solid	SVOCs and SVOCs SIM	8270D_26-3	1 per 10 samples	1 per 20 samples
Aqueous	VOCs	8260C_21-3	1 per 10 samples	1 per 20 samples
Solid	VOCs	8260C_21-4	1 per 10 samples	1 per 20 samples
Aqueous	PCBs	8082A_24-2	1 per 10 samples	1 per 20 samples
Solid	PCBs	8082A_24-7	1 per 10 samples	1 per 20 samples
Aqueous	Metals	6020_22-3	1 per 10 samples	1 per 20 samples
Solid	Metals	6020_22-3	1 per 10 samples	1 per 20 samples
Aqueous	Mercury	7470_22-2	1 per 10 samples	1 per 20 samples
Solid	Mercury	7471_22-2	1 per 10 samples	1 per 20 samples
Aqueous	Hexavalent Chromium	218.6_29-33	1 per 10 samples	1 per 20 samples
Solid	Hexavalent Chromium	7199_29-53	1 per 10 samples	1 per 20 samples
Aqueous	TOC	SM5310C_29-7	1 per 10 samples	1 per 20 samples
Solid	TOC	SW9060A_29-34	1 per 10 samples	1 per 20 samples
Aqueous	RSK-175	RSK-175_32-7	1 per 10 samples	1 per 20 samples
Aqueous	COD	EPA 410.4_29-50	1 per 10 samples	1 per 20 samples
Aqueous	Alkalinity	SM2320B_29-26	1 per 10 samples	1 per 20 samples
Aqueous	Sulfide	SM4500 S2D_29-70	1 per 10 samples	1 per 20 samples
Aqueous	Biochemical Oxygen Demand (BOD)	SM5210B_29-43	1 per 10 samples	1 per 20 samples
Aqueous	Anions	SW9056_29-46	1 per 10 samples	1 per 20 samples
Solid	oH	SW9045D_29-22	1 per 10 samples	1 per 20 samples
Solid	ORP	SM2580B_29-58	1 per 10 samples	1 per 20 samples

Notes:
[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet_#23).
MS/MSD matrix spike/matrix spike duplicate

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Worksheet #21: Project Sampling Procedures References Table

Reference Number	Title, Revision Date, and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP 3-01	Utility Clearance	AECOM	Flagging for locations, utilities; Additional equipment provided by the subcontractor/agency	N	See SOP for detailed procedures
SOP 3-02	Logbooks	AECOM	Field logbook and field forms	N	See SOP for detailed procedures
SOP 3-03	Recordkeeping, Sample Labeling, and Chain-of-Custody	AECOM	Sample labels, pen with indelible ink, and sample attribute forms, Chain of Custody (COC) forms,	N	See SOP for detailed procedures
SOP 3-04	Sample Handling, Storage, and Shipping	AECOM	COC, custody seals, ice, cooler, resealable bags, bubble wrap, air bills	N	See SOP for detailed procedures
SOP 3-05	Investigation-Derived Waste Management	AECOM	DOT-approved drums or other containers, 5 gallon buckets, PID, labeling material	N	See SOP for detailed procedures
SOP 3-06	Equipment Decontamination	AECOM	Plastic sheeting, buckets, potable water, DI water, isopropanol, Alconox/Liquinox	N	See SOP for detailed procedures
SOP 3-07	Land Surveying	AECOM	Total station, GPS receivers, handheld tablets, digital levels, subsurface locators, GIS and surveying software	N	See SOP for detailed procedures
SOP 3-10	Surface Water and Liquid Sampling	AECOM	Water quality meter, laboratory-supplied sample containers, scoop/trowel, labels	N	See SOP for detailed procedures
SOP 3-12	Monitoring Well Installation	AECOM	DPT or Sonic drill rig, PID, water level meter, water quality meter, well screen, casing, riser, submersible pump	N	See SOP for detailed procedures
SOP 3-13	Monitoring Well Development	AECOM	PID, submersible pump, tubing, water level meter, water quality meter, power source, 55-gallon drums	N	See SOP for detailed procedures
SOP 3-14	Monitoring Well Sampling	AECOM	PID, submersible pump, tubing, water level meter, water quality meter, power source, laboratory-supplied sample containers	N	See SOP for detailed procedures
SOP 3-15	Monitoring Well and Borehole Abandonment	AECOM	Plastic sheeting, buckets, water	N	See SOP for detailed procedures
SOP 3-16	Soil and Rock Classification	AECOM	DPT or Sonic drill rig, field logbook, ruler, tape measure, grain size chart, Munsell color chart	N	See SOP for detailed procedures

Worksheet #21: Project Sampling Procedures References Table (Continued)

Reference Number	Title, Revision Date, and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP 3-17	Direct Push Sampling Techniques	AECOM	DPT or Sonic drill rig, field logbook, ruler, tape measure, sampling device, trowels, bowls, laboratory-supplied sample containers	N	See SOP for detailed procedures
SOP 3-18	Field Analysis of Ferrous Iron Using the HACH DR890 Colorimeter and HACH Method 8146	AECOM	HACH DR/890 colorimeter, HACH "AccuVac ampuls," HACH colorimeter sample cell with cap, Plastic cups and lids, Graduated cylinders, Kimwipes®, Pipetter, Deionized water for dilutions	N	See SOP for detailed procedures
SOP 3-20	Operation and Calibration of a Photoionization Detector	AECOM	PID, calibration gas, tedlar bag	N	See SOP for detailed procedures
SOP 3-21	Surface and Subsurface Soil Sampling Procedures	AECOM	Sampling trowels, PID stainless steel bowls, field logbook, flagging, laboratory-supplied sample containers	N	See SOP for detailed procedures
SOP 3-22	Sediment Sampling	AECOM	Scoop/trowel, laboratory-supplied sample containers, labels	N	See SOP for detailed procedures
SOP 3-24	Water Quality Parameter Testing for Groundwater Sampling	AECOM	submersible pump, tubing, water level meter, water quality meter, power source	N	See SOP for detailed procedures
SOP 3-35	In-Situ Hydraulic Conductivity Testing via Rising or Falling Head Slug Testing	AECOM	Boring logs, Well construction diagrams, Well development logs, Water level meter, Slug (bailer or solid cylinder), Nylon string, Water level indicator, Pressure transducer(s), Data logger(s), Computer with appropriate software, Plastic sheeting	N	See SOP for detailed procedures
ASTM D1587	Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes	ASTM	DPT drill rig, field logbook, laboratory-supplied Shelby tube containers	N	See Standard Practice for detailed procedures

Worksheet #23: Analytical SOP References Table

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
21-3	9013078...11996…Determination of Volatile Target Compounds and Gasoline Range Organics (GRO) by Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS) in Waters and Wastewaters by Method 8260C, Rev 5, effective 6/29/16	Definitive	Water GC/MS VOCs	GC/MS	ELLE	N
21-4	9013077...11995…Determination of Volatile Target Compounds and Gasoline Range Organics (GRO) by Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS) in Soils and Solids by Method 8260C, Rev 4, effective 6/24/16	Definitive	Solid, Tissue GC/MS VOCs	GC/MS	ELLE	N
21-8	9015073...0388…Preparation of Vials for Field Preservation of Soils for Volatile Analysis, Rev 16, effective 09/30/16	N/A	Organic Solids Preparation	N/A	ELLE	N
21-9	9015389...LOM-SOP-LAB-235…Balances, Syringe, Pipette Verification, Rev 7, effective 10/21/15	N/A	Maintenance	Balance	ELLE	N
21-10	9015467...SOP-MS-004…GC/MS Instrumentation Maintenance, Rev 8, effective 02/3/15	N/A	Maintenance	GC/MS	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
22-2	9015067...0259, 0159 Mercury in Aqueous, Solid, and Tissue Samples by Cold Vapor Atomic Absorption, Rev 16, effective 11/27/15	Definitive	Solid, liquid, tissues Metals	ICP	ELLE	N
22-3	9018443...6142… \Metals by Inductively Coupled Plasma Mass Spectrometry for SW-846 Methods 6020/6020A (aqueous, solid, tissue), and EPA 200.8 (aqueous), Rev 6, effective 01/15/15	Definitive	Solid, liquid, tissues Metals	ICP/MS	ELLE	N
22-4	9015159…5705…Sample Preparation of Wastewater and Leachates for Analysis of Total Metals by Inductively Coupled Plasma Atomic Emission Spectrometry), Rev 12, effective 01/19/15	N/A	Liquid Inorganic Preparation	N/A	ELLE	N
22-5	9015160...5708, 10637 Sample Prep of Sediments, Sludges, Soils, and Tissues for Analysis of Metals by ICP and ICP-MS Rev 23, effective 12/23/15	N/A	Solid and tissues Inorganic Preparation	N/A	ELLE	N
22-6	9015082...5713, 5714 Digestion of Aqueous Samples by SW-846 Method 7470A and EPA 254.1, Rev 19, effective 10/13/16	N/A	Liquid Inorganic Preparation	N/A	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
22-7	9015161...5711, 10638 Sample Preparation of Soil, Sediment, Sludge, Oils, and Tissues for Total Mercury Analysis by Atomic Absorption Cold Vapor Technique, Rev 19, effective 07/19/16	N/A	Solid, tissue, and oil Inorganic Preparation	N/A	ELLE	N
22-9	9015165...6050, 10639 Sample Preparation of Leachates and Other Wastewater for Analysis of Total Metals by Inductively Coupled Plasma-Mass Spectrometer (ICP-MS) Rev 12, effective 01/19/15	N/A	Liquid Inorganic Preparation	N/A	ELLE	N
24-2	9015079…6654…Separatory Funnel Extraction by Method 3510C, 608 or 622 for Pesticides and PCBs in Wastewater, Rev 19, effective 07/7/16	N/A	Organic Preparation Method 3510C	N/A	ELLE	N
24-7	9015109...10591…Analysis of Polychlorinated Biphenyls (PCBs) by 8082A in Aqueous Samples using GC-ECD, Rev 5, effective 11/04/15	Definitive	PCBs	GC	ELLE	N
24-10	9015110...10592…Analysis of Polychlorinated Biphenyls (PCBs) in Solid Samples by 8082A using GC-ECD, Rev 8, effective 08/26/16	Definitive	PCBs	GC	ELLE	N
24-12	9015104...10497…Microwave Extraction Procedure for the Determination of PCBs in a Solid Matrix, Rev 7, effective 12/03/15	N/A	Organic Preparation Method 3546	N/A	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
24-20	9015495...SOP-PP-013: Preventive and Corrective GC Maintenance, Rev 5, effective 07/5/11	N/A	Maintenance	N/A	ELLE	N
26-2	9015100...10461, 10462, 13624…Semivolatile Organic Compounds by Method 8270D in Aqueous and Non-Aqueous Matrices Using GC-MS, Rev 6, effective 3/23/16	Definitive	Water, solid, tissue, leachate GC/MS SVOCs	GC/MS	ELLE	N
26-3	9015192...8357, 10725, 12969, 12971…Semivolatiles by Method 8270C/D SIM, Rev 12, effective 09/08/16	Definitive	Water, solid, tissue GC/MS SVOCs SIM	GC/MS	ELLE	N
26-4	9015076...813, 11010…Separatory Funnel Extraction by Method 5310C for BNAs in Wastewater, Rev 14, effective 09/30/16	N/A	Method 3510C water prep	N/A	ELLE	N
26-5	9015121...11012, 10465, 10470, 10466…Separatory Funnel Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables by SIM in a Wastewater Matrix, Rev 8, effective 09/30/16	N/A	Method 3510C SIM water prep	N/A	ELLE	N
26-6	9015105…10498, 10809, 10811…Microwave Extraction Procedure for the Determination of Semivolatiles in a Solid Matrix , Rev 11, effective 10/4/16	N/A	Method 3546 microwave (standard, SIM, and tissue) prep	N/A	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
26-9	9015393...MC-EX-01…GC/MS Preventative and Corrective Maintenance, Rev 5, effective 4/13/11	N/A	Maintenance	GC/MS	ELLE	N
26-14	9015149…4731…Separatory Funnel Extraction (Method 5310C) or Waste Dilution (Method 3580A) of Base Neutrals and Acid Extractables, Rev 12, effective 4/26/16	N/A	Method 3510C water; TCLP prep	N/A	ELLE	N
28-1	9015085...0946, 2573, 0075 Toxicity Leacing Characteristic Procedure TCLP Zero Headspace Leachate Method 1311, Rev. 11 effective 03/29/12	N/A	TCLP Extraction	N/A	ELLE	N
28-2	9015086…0947, 1339 Toxicity Leaching Procedure (TCLP) Non-Volatile Leachates, Rev. 11, effective 02/1/16	N/A	TCLP Leachate	N/A	ELLE	N
29-2	9013032...Reactive Sulfide, Rev 9, effective 11/14/11	Definitive	Solid	Flow Analyzer	ELLE	N
29-19	9012741...Ignitability of Solids, Rev 8, effective 11/9/15	Definitive	Solid	NA	ELLE	N
29-22	9011685…394...pH (SW, electrometric), Rev 11, effective 10/13/16	Definitive	Solid	pH meter	ELLE	N
29-24	9013418...Determination of TOC and TC in Solids and Sludges by Combustion, Rev 15, effective 10/30/13	Definitive	Water	TOC Analyzer	ELLE	N
29-33	9029677...12868...Low Level Hexavalent Chromium by Ion Chromatography in Solids and Water, Rev 1, effective 10/20/2014	Definitive	Water/Solid	IC Analyzer	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
29-34	9013989…5892… Determination of Hexavalent Chromium by Ion Chromatography in Solids and Waters SW-846 7199 and EPA 218.6, Rev 14, effective 11/12/2014	Definitive	Water/Solid	IC Analyzer	ELLE	N
29-39	9011646…Determination of Total and Amenable Cyanide in Water, Wastewater, and Soils, Free CN in Water and Wastewater, Reactive Cyanide of Solids, and Weak Acid Dissociable Cyanide in Water and Soils…Rev 17, effective 4/28/2014	Definitive	Water/Solid	Flow Analyzer	ELLE	N
29-42	9011689...Determination of Flashpoint for Liquids Rev 9, effective 10/6/2014 Rev 9, effective 10/6/2014	Definitive	Water	Pensky Marten Closed Cup Tester	ELLE	N
29-53	9011687…Hexavalent Chromium in Solids (Alkane digest and analysis methods), Rev 16, effective 8/8/14	Definitive	Solid	Spectrophotometer	ELLE	N
29-46	9015115…10697, 10698, 10699...Determination of Inorganic Anions by Ion Chromatography (DOD), Rev 4, effective 9/8/14	Definitive	Water	IC	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
29-26	9013112...Analysis of Conductivity, Alkalinity, pH, Temperature of pH, Fluoride, Turbidity, Total Hardness, Carbonate, Bicarbonate, and Ammonia by Either Man-Tech Multi-Parameter System or Manual Technique, Rev 9; effective 11/23/15	Definitive	Water	Man-Tech Multi-Parameter System	ELLE	N
29-70	9011642…230, 10293, 10499...Colorimetric Sulfide in Water, Sulfide as H2S, Dissolved Sulfide in Water by 4500-S2 B/C/D, 4500-S2 F-2000, or EPA 376.2, Rev 16, effective 6/2/15	Definitive	Water	UV Spec	ELLE	N
32-7	9015178...7105, 10602…Volatile Hydrocarbons in Water by Method RSK-175 Modified and SW-846 8015 Using Headspace Sampling Techniques and GC-FID, Rev 15, effective 08/08/16	Definitive	Volatile Headspace Hydrocarbons	GC	ELLE	N
29-58	9013403…1821...Oxidation-Reduction Potential, Rev 13, effective 4/13/15	Definitive	Water/Solid	ORP Electrode	ELLE	N

Worksheet #23: Analytical SOP References Table (Continued)

Lab SOP Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
29-43	9011645 BOD by SM 5210B-2001 or EPA 405.1 and CBOD by SM 5210B-2001 in Water; Rev 13, effective 11/16/15	Definitive	Water	DO Meter	ELLE	N
29-50	9013470…4001...Chemical Oxygen Demand (Dichromatic Reflux Method) (Colormetric), Rev 9, effective 9/2/13	Definitive	Water	Spectrophotometer	ELLE	N

Notes:

CVAA Cold vapor atomic absorption
DO Dissolved Oxygen
ECD Electron capture detector
ELLE Eurofins Lancaster Laboratories Environmental
EPA Environmental Protection Agency, United States
GC Gas Chromatograph
GC/MS Gas Chromatograph/Mass Spectrometry
ICP Inductively Coupled Plasma
ORP Oxidation Reduction Potential

Worksheet #28.1: QC Samples Table

Matrix Solid
Analytical Group VOA
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8260C/21-4
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze samples if outside limits. If confirmed, report with a comment. If blank or LCS surrogates are outside limits, reanalyze. If still outside limits evaluate the instrument and spiker unit before proceeding.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	If the MB contains target analytes and the associated samples do not, corrective action is not required. If sample detects are10x the blank value data can be reported. Otherwise reanalyze samples after a clean MB is obtained.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample

Worksheet #28.1: QC Samples Table (Continued)

QC Sample	Frequency/ Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Analytes in the LCS that fail high and are ND in the samples can be reported. For all others reanalyze LCS and samples. If it still fails, perform instrument maintenance, restart the tune period and reanalyze all QC and samples.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to + 100% of internal standard area of 12 hour STD. RT change	Check the instrument for possible problems and then reanalyze samples. If reinject confirms, report with a comment.	ELLE Analyst	Precision	Results within acceptance limits

Notes:
RL = Reporting Limit
RPD = Relative Percent Difference
MS = Matrix Spike
MSD = Matrix Spike Duplicate
QSM = Quality Services Manual
LCS = Laboratory Control Spike
CRQL =Contract Required Quantification Limit

Worksheet #28.2: QC Samples Table

Matrix Water
Analytical Group VOA
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8260C/21-3
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/ Number	Method /SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze samples if outside limits. If confirmed, report with a comment. If blank or LCS surrogates are outside limits, reanalyze. If still outside limits evaluate the instrument and spiker unit before proceeding.	ELLE Analyst	Accuracy	Results within acceptance limits

Worksheet #28.2: QC Samples Table (Continued)

QC Sample	Frequency/ Number	Method /SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	If the MB contains target analytes and the associated samples do not, corrective action is not required. If sample detects are10x the blank value data can be reported. Otherwise reanalyze samples after a clean MB is obtained.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Analytes in the LCS that fail high and are ND in the samples can be reported. For all others reanalyze LCS and samples. If it still fails, perform instrument maintenance, restart the tune period and reanalyze all QC and samples.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.2: QC Samples Table (Continued)

QC Sample	Frequency/ Number	Method /SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to + 100% of internal standard area of 12 hour STD. RT change	Check the instrument for possible problems and then reanalyze samples. If reinject confirms, report with a comment.	ELLE Analyst	Precision	Results within acceptance limits

Notes:
RL = Reporting Limit
RPD = Relative Percent Difference
MS = Matrix Spike
MSD = Matrix Spike Duplicate
QSM = Quality Services Manual
LCS = Laboratory Control Spike
CRQL =Contract Required Quantification Limit

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Worksheet #28.3: QC Samples Table

Matrix Solid
Analytical Group SVOC
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8270C/D/26-1 & 26-2
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.3: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to +100% of internal standard area of 12 hour STD. RT change ≤30 sec. of associated reference standard	Reanalyze, document if confirmed.	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.4: QC Samples Table

Matrix Water
Analytical Group SVOC
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8270C/D/26-1 & 26-2
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.4: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to +100% of internal standard area of 12 hour STD. RT change ≤30 sec. of associated reference standard	Reanalyze, document if confirmed.	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.5: QC Samples Table

Matrix TCLP
Analytical Group SVOC
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8270C/D/26-1 & 26-2
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.5: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to +100% of internal standard area of 12 hour STD. RT change ≤30 sec. of associated reference standard	Reanalyze, document if confirmed.	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.6: QC Samples Table

Matrix Solid
Analytical Group SVOC
Concentration Level Low - SIM
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8270C/D SIM26-3
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.6: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to +100% of internal standard area of 12 hour STD. RT change ≤30 sec. of associated reference standard	Reanalyze, document if confirmed.	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.7: QC Samples Table

Matrix Water
Analytical Group SVOC
Concentration Level Low - SIM
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8270C/D SIM26-3
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.7: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤20%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Internal standards	Per sample (including MS/MSD, LCS, and blanks)	-50% to +100% of internal standard area of 12 hour STD. RT change ≤30 sec. of associated reference standard	Reanalyze, document if confirmed.	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.8: QC Samples Table

Matrix Solid
Analytical Group PCBs
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8082A/24-10
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤30%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.8: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤30%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.9: QC Samples Table

Matrix Water
Analytical Group PCBs
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 8082A/24-7
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Recovery limits per QSM 5.0. Laboratory statistical limits for surrogates not in QSM 5.0	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤30%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.9: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤30%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits

Worksheet #28.10: QC Samples Table

Matrix Water
Analytical Group Metals
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 6020A/B/22-3
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per prep batch of up to 10 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze blank to confirm detections. If detects confirm, redigest samples that are not ND or not >20x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0. ±25% for elements not in QSM 5.0.; RPD ≤20%	Analyze post digestion spike and serial dilution	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0. ±20% for elements not in QSM 5.0.; RPD ≤20%	Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-digested and reanalyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples	RPD must be ≤20%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.10: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Serial Dilutions	Must be prepared with each background sample, evaluated only when analyte concentrations are >5-10x the LOQ.	The percent difference must be ≤10%	Flag data	ELLE Analyst	Precision	Results within acceptance limits
Post Digestion Spike	Prepare with each background sample	± 20% True Value	No specific action needed unless required by the project. PDS is reported in data package	ELLE Analyst	Accuracy/Bias	Results within acceptance criteria
Internal Standard	Every sample and QC	Must be 30%-120% of the calibration blank	Reanalyze at a dilution	ELLE Analyst	Precision	Results within acceptance criteria

Worksheet #28.11: QC Samples Table

Matrix Solid
Analytical Group Metals
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 6020A/B/22-3
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per prep batch of up to 10 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze blank to confirm detections. If detects confirm, redigest samples that are not ND or not >20x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0. ±25% for elements not in QSM 5.0.; RPD ≤20%	Analyze post digestion spike and serial dilution	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0. ±20% for elements not in QSM 5.0.; RPD ≤20%	Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-digested and reanalyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples	RPD must be ≤20%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.11: QC Samples Table (Continued)

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Serial Dilutions	Must be prepared with each background sample, evaluated only when analyte concentrations are >5-10x the LOQ.	The percent difference must be ≤10%	Flag data	ELLE Analyst	Precision	Results within acceptance limits
Post Digestion Spike	Prepare with each background sample	± 20% True Value	No specific action needed unless required by the project. PDS is reported in data package	ELLE Analyst	Accuracy/Bias	Results within acceptance criteria
Internal Standard	Every sample and QC	Must be 30%-120% of the calibration blank	Reanalyze at a dilution	ELLE Analyst	Precision	Results within acceptance criteria

Worksheet #28.12: QC Samples Table

Matrix Water
Analytical Group Metals - Hg
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 7470A
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per prep batch of up to 10 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze blank to confirm detections. If detects confirm, redigest samples that are not ND or not >20x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0; RPD ≤20%	Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-digested and reanalyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples	RPD must be ≤20%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.13: QC Samples Table

Matrix Solid
Analytical Group Metals - Hg
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 7471A/B
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per prep batch of up to 10 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample	Reanalyze blank to confirm detections. If detects confirm, redigest samples that are not ND or not >20x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample
MS/MSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 10 samples	Recovery limits per QSM 5.0; RPD ≤20%	Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-digested and reanalyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples	RPD must be ≤20%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.14: QC Samples Table

Matrix Solid
Analytical Group Hexavalent Chromium
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 7199/29-34
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch	No analytes detected > 1/2 LOQ	Correct problem, reprepare and reanalyze the method blank and all sample associated	ELLE Analyst	Contamination	No analytes detected > 1/2 LOQ
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤20%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per batch	RPD≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits
Matrix Spike/Matrix Spike Duplicate	1 per batch	Laboratory specified recovery limits and RPD ≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision/Bias	Results within acceptance limits

Worksheet #28.15: QC Samples Table

Matrix Water
Analytical Group Hexavalent Chromium
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 218.6/29-33
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch	No analytes detected > 1/2 LOQ	Correct problem, reprepare and reanalyze the method blank and all sample associated	ELLE Analyst	Contamination	No analytes detected > 1/2 LOQ
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤20%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per batch	RPD≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits
Matrix Spike/Matrix Spike Duplicate	1 per batch	Laboratory specified recovery limits and RPD ≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision/Bias	Results within acceptance limits

Worksheet #28.16: QC Samples Table

Matrix Solid
Analytical Group Total Organic Carbon
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 9060A/29-24
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch	No analytes detected > 1/2 LOQ	Correct problem, reprepare and reanalyze the method blank and all sample associated	ELLE Analyst	Contamination	No analytes detected > 1/2 LOQ
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤20%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per 10 samples	RPD≤7%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits
Matrix Spike/Matrix Spike Duplicate	1 per 10 samples	Laboratory specified recovery limits and RPD ≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Bias	Results within acceptance limits

Worksheet #28.17: QC Samples Table

Matrix Sludge
Analytical Group Reactive Sulfide
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 9034/29-2
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch	No analytes detected > 1/2 LOQ	Correct problem, reprepare and reanalyze the method blank and all sample associated	ELLE Analyst	Contamination	No analytes detected > 1/2 LOQ
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤17%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per batch	RPD≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits
Matrix Spike/Matrix Spike Duplicate	1 per batch	Laboratory specified recovery limits and RPD ≤24%	No corrective action, matrix related	ELLE Analyst	Analytical Precision/Bias	Results within acceptance limits

Worksheet #28.18: QC Samples Table

Matrix Sludge
Analytical Group Reactive Cyanide
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 9012A Modified/29-39
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1 per batch	No analytes detected > 1/2 LOQ	Correct problem, reprepare and reanalyze the method blank and all sample associated	ELLE Analyst	Contamination	No analytes detected > 1/2 LOQ
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤20%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per batch	RPD≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits
Matrix Spike/Matrix Spike Duplicate	1 per batch	Laboratory specified recovery limits and RPD ≤11%	No corrective action, matrix related	ELLE Analyst	Analytical Precision/Bias	Results within acceptance limits

Worksheet #28.19: QC Samples Table

Matrix Solid
Analytical Group pH
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 9045D Modified/29-22
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤3%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per 10 samples	RPD≤3%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits

Worksheet #28.20: QC Samples Table

Matrix Liquid or Solid
Analytical Group Flashpoint
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference 1010A/29-42
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤4%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per 10 samples	RPD≤20%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits

Worksheet #28.21: QC Samples Table

Matrix Soil
Analytical Group Corrosivity
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference Chapter 7/29-24
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	NA	NA	NA	ELLE Analyst	Contamination	No analytes detected > 1/2 LOQ
Laboratory Control Standard	1 per batch	Laboratory specified recovery limits and RPD ≤20%	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Analytical Accuracy	Results within acceptance limits
Duplicate	1 per batch	RPD≤2%	No corrective action, matrix related	ELLE Analyst	Analytical Precision	Results within acceptance limits
Matrix Spike/Matrix Spike Duplicate	NA	NA	NA	ELLE Analyst	Analytical Precision/Bias	Results within acceptance limits

Worksheet #28.22: QC Samples Table

Matrix Water
Analytical Group Anions
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference SW-846 9056A; 29-46
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Reanalyze blank to confirm detections. If detects confirm, reprep samples that are not ND or not >10x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater
MS/MSD	1 per 10 samples (batch not to exceed 20 samples)	Recovery limits per QSM 5.0; RPD ≤20%	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-prepped or re-digested.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples (batch not to exceed 20 samples)	RPD ≤20%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.23: QC Samples Table

Matrix Water
Analytical Group TOC
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference SM5310C-2000; 29-7
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Reanalyze blank to confirm detections. If detects confirm, reprep samples that are not ND or not >10x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater
MS/MSD	1 per 10 samples (batch not to exceed 20 samples)	Laboratory statistical limits for compounds and RPD	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Laboratory statistical limits for compounds and RPD	Correct problem, reprepare and reanalyze the LCS and all sample associated	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples (batch not to exceed 20 samples)	RPD ≤3%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.24: QC Samples Table

Matrix Water
Analytical Group Sulfide (colorimetric)
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference SM 4500 S2D/EPA 376.2; 29-70
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blank	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Reanalyze blank to confirm detections. If detects confirm, reanalyze samples that are not ND or not >10x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater
MS/MSD	1 per prep batch of up to 20 samples	Laboratory statistical or method window and RPD, whichever is tighter	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Laboratory statistical or method window and RPD, whichever is tighter	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-analyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples	RPD ≤5%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.25: QC Samples Table

Matrix Water
Analytical Group Alkalinity
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference SM 2320B-1997; 29-26
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blank	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Reanalyze blank to confirm detections. If detects confirm, reanalyze samples that are not ND or not >10x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater
MS/MSD	1 per prep batch of up to 20 samples	Laboratory statistical or method window and RPD, whichever is tighter	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Laboratory statistical or method window and RPD, whichever is tighter	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-analyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per 10 samples	RPD ≤5%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.26: QC Samples Table

Matrix Water
Analytical Group Volatile Headspace Hydrocarbons
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference RSK-175; 32-7
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Surrogate Spike	Per sample (including MS/MSD, LCS, and Blanks)	Laboratory statistical limits	Reanalyze if outside limits, if confirmed, report data with comment. If not confirmed re-extract.	ELLE Analyst	Accuracy	Results within acceptance limits
Method blanks	1 per prep batch of up to 20 samples	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater	Reanalyze to confirm detections. If detects confirm reextract samples that are not ND or not >10x the blank value	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > 1/2 LOQ or >1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater
MS/MSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤30%	Flag outliers	ELLE Analyst	Accuracy/Bias/ Precision	Results within acceptance limits
LCS/LCSD	1 per prep batch of up to 20 samples	Recovery limits per QSM 5.0. Laboratory statistical limits for compounds not in QSM 5.0.; RPD ≤30%	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-extracted.	ELLE Analyst	Accuracy/Bias/ Precision	Results within acceptance limits

Worksheet #28.27: QC Samples Table

Matrix Water
Analytical Group Biochemical Oxygen Demand
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference SM 5210B; 29-43
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Unseeded Blank	1 per prep batch of up to 20 samples	Depletion <= 0.20 mg/l	Correct problem, flag associated sample data	ELLE Analyst	Contamination	Results within acceptance limits
MS/MSD	1 per prep batch of up to 20 samples	Laboratory statistical or method window and RPD, whichever is tighter	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS	1 per prep batch of up to 20 samples	Laboratory statistical or method window, whichever is tighter	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-analyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per prep batch of up to 20 samples	RPD ≤28%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

Worksheet #28.28: QC Samples Table

Matrix Water
Analytical Group Chemical Oxygen Demand
Concentration Level Low
Sampling SOP See Worksheet #21
Analytical Method/ SOP Reference EPA 410.4; 29-50
Sampler's Name TBD
Field Sampling Organization AECOM
Analytical Organization Eurofins Lancaster Laboratories Environmental, LLC (ELLE)
No. of Sample Locations See Worksheet # 18

QC Sample	Frequency/Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method blank	1 per prep batch of up to 20 samples	No analytes detected > LOQ	Reanalyze blank to confirm detections. If detects confirm, reanalyze samples that are not ND or not >10x the blank value.	ELLE Analyst	Accuracy/Laboratory Contamination	No analytes detected > LOQ
MS/MSD	1 per 10 samples	Laboratory statistical or method window and RPD, whichever is tighter	Flag outliers	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
LCS	1 per prep batch of up to 20 samples	Laboratory statistical or method window, whichever is tighter	Reanalyze LCS and associated samples. Analytes in the LCS that fail high and are ND in the samples can be reported. All others are re-analyzed.	ELLE Analyst	Accuracy/Bias/Precision	Results within acceptance limits
Duplicate	1 per prep batch of up to 20 samples	RPD ≤9%	Flag data	ELLE Analyst	Precision	Results within acceptance limits

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Worksheet #30: Analytical Services Table

Matrix	Analytical Group	Concentration Level	Sample Locations / ID Number	Analytical Method	Data Package Turnaround Time	Laboratory / Organization	Backup Laboratory / Organization
Solid/ Aqueous	VOCs	Low	TBD; Reference SAP	SW8260C	Level IV 21 calendar days	Eurofins Laboratories 2425 New Holland Pike Lancaster, PA, 17601 717-656-2300 (office) 717-656-2681 (fax)	NA
	SVOCs SIM	Low		SW8270D/ SW8270D SIM			
	Metals	Low		SW6020A			
	Mercury	Low		SW7471B/ SW7470A			
	PCBs	Low		SW8082A			
	Hexavalent Chromium	Low		SW7199/ EPA218.6			
Solid	TOC and pH	Low	TBD; Reference SAP	SW9060A; SW9045D	Level IV 21 calendar days	Eurofins Laboratories 2425 New Holland Pike Lancaster, PA, 17601 717-656-2300 (office) 717-656-2681 (fax)	NA
Water	MNA parameters (Anions, TOC, Alkalinity, sulfide, volatile headspace hydrocarbons, biochemical oxygen demand, chemical oxygen demand)	Low	TBD; Reference SAP	SW9056A; SM5310C; SM2320B; SM4500 S_2D; RSK-175; SM5210B; EPA410.4	Level IV 21 calendar days	Eurofins Laboratories 2425 New Holland Pike Lancaster, PA, 17601 717-656-2300 (office) 717-656-2681 (fax)	NA

Notes:

EPA	Environmental Protection Agency, United States
ID	identification
MNA	Monitored Natural Attenuation
PCB	Polychlorinated Biphenyl
SVOC	Semivolatile Organic Compounds
SAP	Sampling and Analysis Plan
SIM	Selective Ion Monitoring
VOC	Volatile Organic Compounds
TBD	to be determined
TOC	Total Organic Carbon

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Worksheet #34, 35, and 36: Data Verification and Validation (Steps IIa and IIb) Process Table

Data Review Input	Description	Responsible for Verification	Step I/IIa/IIb(1)
Verification Chain-of-custody forms Sample Login/Receipt	Review the sample shipment for completeness, integrity, and sign accepting the shipment. All sample labels will be checked against the chain-of-custody form, and any discrepancies will be identified, investigated, and corrected. The samples will be logged in at every storage area and work station required by the designated analyses. Individual analysts will verify the completeness and accuracy of the data recorded on the forms. Verification of sample login/receipt and chain-of-custody forms will be documented on the laboratory sample receipt form.	Laboratory sample custodians and analysts	I
Verification Chain-of-custody forms	Check that the chain-of-custody form was signed/dated by the sampler relinquishing the samples and by the laboratory sample custodian receiving the samples for analyses.	Project Chemist or Data Validators	I
Verification SAP sample tables	Verify that all proposed samples listed in the SAP tables have been collected. Sample completeness will be documented in the data validation report.	Site Supervisor or Designee	I
Verification Sample log sheets and field notes	Verify that information recorded in the log sheets and field notes are accurate and complete. Sample log sheet verification will be documented by dated signature on the last page or page immediately following the review material.	Site Supervisor or Designee	I
Verification Field QC samples	Check that field QC samples, described in Worksheet #12 and listed in Worksheet #18,19,20,30 were collected as required. QC sample completeness will be documented in the data validation report.	Site Supervisor or Designee	I
Verification Analytical data package	All analytical data packages will be verified internally for completeness by the laboratory performing the work. The laboratory project manager (or designee) will sign the case narrative for each data package. All laboratory data package reviews will be documented in the laboratory narratives.	Laboratory Project Manager	I
Verification Analytical data package	Verify the data package for completeness. Missing information will be requested from the laboratory and validation (if performed) will be suspended until missing data is received. Data package completeness will be documented in the data validation report.	Site Supervisor, Project Chemist or Data Validators	I
Verification Electronic data deliverables	Verify the electronic data against the chain-of-custody and hard copy data package for accuracy and completeness before loading into project database. Electronic data deliverable verification will be documented.	Data Manager and/or Data Validators	I
Validation Chain-of-custody	Examine the traceability of the data from time of sample collection until reporting of data. Ensure that the custody and integrity of the samples were maintained from collection to analysis and that custody records are complete and any deviations are recorded. Chain-of-custody verification will be documented in the data validation report.	Project Chemist or Data Validators	IIa

Worksheet #34, 35, and 36: Data Verification and Validation (Steps IIa and IIb) Process Table (Continued)

Data Review Input	Description	Responsible for Verification	Step I/IIa/IIb(1)
Validation Holding Times	Review that the samples were shipped and stored at the required temperature, meeting the requirements listed in Worksheet #18,19,20,30. Ensure that the analyses were performed within the holding times. If holding times were not met, confirm that deviations were documented. Holding time examination will be documented in the data validation report.	Project Chemist or Data Validators	IIa
Validation Sample results for representativeness	Check that the laboratory recorded both the temperature at sample receipt and the pH of the chemically preserved samples (if applicable) to ensure sample integrity was sustained from sample collection to analysis. Representativeness will be documented in the data validation report.	Project Chemist or Data Validators	IIa/IIb
Validation Laboratory data results for accuracy	Ensure that the laboratory QC samples were analyzed and that the measurement performance criteria, listed in Worksheet #28, were met for all field samples and QC analyses. Check that specified field QC samples were collected and analyzed, as listed in Worksheet #12, and that the analytical QC criteria were met. Accuracy will be documented in the data validation report.	Project Chemist or Data Validators	IIa/IIb
Validation Field and laboratory duplicate analyses for precision	Check the field sampling precision by calculating the RPD for field duplicate samples. Check the laboratory precision by reviewing the RPD or percent difference values from laboratory duplicate analyses; MS/MSDs; and LCS/LCS duplicates. Ensure compliance with the precision goals listed in Worksheets #12 and #28. Precision will be documented in the data validation report.	Project Chemist or Data Validators	IIa/IIb
Validation Project action limits	Assess and document the impact on matrix interferences or sample dilutions performed because of the high concentration of one or more contaminant on the other target compounds reported as undetected. Project action limit achievement will be documented in the data validation report.	Project Chemist or Data Validators	IIa/IIb
Validation Data quality assessment report	Summarize deviations from methods, procedures, or contracts. Qualify data results based on method or QC deviation and explain all the data qualifications. Present tabular qualified data and data qualifier codes and summarize data qualification outliers. Determine if the data met the MPC and determine the impact of any deviations on the technical usability of the data. Result qualification will be documented in the in the data validation report.	Project Chemist or Data Validators	IIa/IIb
Validation SAP QC sample documentation	Ensure that all QC samples specified in the SAP were collected and analyzed and that the associated results were within acceptance limits. QC sample documentation will be documented in the data validation report	Project Chemist or Data Validators	IIa/IIb
Validation Analytical data deviations	Determine the impact of any deviation from sampling or analytical methods, and laboratory SOP requirements and matrix interferences effect on the analytical results. Data deviations will be documented in the data validation report.	Project Chemist or Data Validators	IIb

Worksheet #34, 35, and 36: Data Verification and Validation (Steps IIa and IIb) Process Table (Continued)

<table>
<tr><th>Data Review Input</th><th>Description</th><th>Responsible for Verification</th><th>Step I/IIa/IIb[1]</th></tr>
<tr><td>Validation
Project quantitation limits for sensitivity</td><td>Ensure that the project limit of detection (LOD) and limit of quantitation (LOQ) were achieved. Project quantitation limit achievement will be documented in the data validation report.</td><td>Project Chemist or Data Validators</td><td>IIb</td></tr>
<tr><td>Validation</td><td>Project validation criteria in accordance with QAPP Worksheets #12, 15, 19, 28, and 37 within this document and cited USEPA
SW-846 methodology. Validation qualifiers applied in accordance with National Functional Guidelines for organic and inorganic data review. Methods for which no data validation guidelines exist will be validated following the NFG deemed most appropriate by the data validator
Validation will be limited to reviewing laboratory quality control summary information and raw data will not be reviewed.</td><td>Project Chemist or Data Validators</td><td>IIa/IIb</td></tr>
<tr><td>Validation
Data qualifiers</td><td>Qualifiers that will be applied during the data validation process are summarized below and, as indicated, results will be considered usable unless qualified by an R-flag. Rejected data will be evaluated and may be used in circumstances identified by the Partnering Team.
<table>
<tr><th>Data Qualifier</th><th>Qualifier Definition</th><th>Interpret Result as a Detection?</th><th>Result Usable?</th><th>Potential Result Bias</th></tr>
<tr><td>no qualifier</td><td>Acceptable</td><td>Yes</td><td>Yes</td><td>None expected</td></tr>
<tr><td>J+/J-</td><td>Estimated</td><td>Yes</td><td>Yes</td><td>High or Low</td></tr>
<tr><td>U</td><td>Undetected</td><td>No</td><td>Yes</td><td>None expected</td></tr>
<tr><td>UJ</td><td>Undetected and Estimated</td><td>No</td><td>Yes</td><td>High or Low</td></tr>
<tr><td>R</td><td>Rejected</td><td>No</td><td>No</td><td>Unspecified</td></tr>
</table></td><td>Project Chemist or Data Validators</td><td>IIa/IIb</td></tr>
</table>

Notes:
1. IIa=compliance with methods, procedures, and contracts [see Table 10, page 117, Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) manual, V.1, March 2005.]
2. IIb=comparison with measurement performance criteria in the SAP [see Table 11, page 118, UFP-QAPP manual, V.1, March 2005]

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The laboratory will provide SEDD version 5.2 Stage 2a for the project. The SEDD files will comply with the EPA published specifications, be in extensible mark-up language (XML) and be provided on a SDG basis.

The USACE ADR web-based program will be used for this project. AECOM will provide the contract laboratory (Eurofins Laboratories) with a project specific ADR eQAPP for their review. The laboratory will utilize the eQAPP to verify compliance of the laboratory SEDD files prior releasing the SEDD files.

The SEDD file will consist of project and laboratory QC samples. The ADR program will check for format and content compliance. ADR will perform an automated data review of the project samples including but not limited to: holding times: sample temperature upon laboratory receipt; laboratory and field blank contamination; and accuracy and precision of laboratory control samples, MS/MSD, surrogates, field duplicates, and laboratory duplicates. ADR will produce validation outlier reports and assign qualifiers.

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Worksheet #37: Data Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used

AECOM will validate the fixed-laboratory data for all definitive analyses conducted. Validation will be conducted in accordance with the protocols described in Worksheets #34-36. These procedures are consistent with EPA National Data Validation Functional Guidelines. The Project Chemist, in conjunction with the project team, will determine whether the analytical data meet the requirements to support the investigation. The results of laboratory measurements will be compared to the data quality objectives described in Worksheet #11.

Describe the evaluative procedures used to assess overall measurement error associated with the project

A data assessment will be performed in accordance with USEPA guidance QA/G-9R, *Data Quality Assessment, A Reviewer's Guide* (EPA/240/B-06/002) dated February 2006. In accordance with USEPA guidance, a data assessment is intended to provide documentation to clearly demonstrate that the collected data are of the right type, quality, and quantity to meet the objectives of the project. A comprehensive evaluation of how the data meet precision, accuracy, representativeness, comparability, and completeness (PARCC) objectives will also be performed. All soil, sediment, surface water, and groundwater analytical data will be validated in-house and the data packages to be presented in the RI report.

The data usability assessment will reconcile the DQOs of this SAP to the results of the data collection and analytical results, data validation evaluation (as applicable), and field QC results.

Data quality indicators, such as precision, accuracy, completeness, representativeness, and comparability measurements, aid in the evaluation process and are discussed in the following subsections.

<u>Precision</u>

The most commonly used estimates of precision are the RPD for cases in which only two measurements are available and the percent relative standard deviation (%RSD) when three or more measurements are available. The latter is especially useful in normalizing environmental measurements to determine acceptability ranges for precision because it effectively corrects for the wide variability in sample analyte concentration indigenous to samples.

Precision is represented as the RPD between measurement of an analyte in duplicate samples or in duplicate spikes. RPD is defined as follows:

$$RPD = \frac{|C_1 - C_2|}{(C_1 + C_2)/2} \times 100$$

Where:

C1 = First measurement value

C2 = Second measurement value

The %RSD is calculated by the standard deviation of the analytical results of the replicate determinations relative to the average of those results for a given analyte. This method of precision measurement can be expressed by the formula:

$$\%RSD = \sqrt{\frac{\sum_{i=1}^{n} x_i^2 - \left[\sum_{i=1}^{n} x_i\right]^2 / n}{n - 1}} \times 100 / RF$$

Where:

RF = Response factor

N = Number of measurements

Precision control limits for evaluation of sample results are established by the analysis of control samples. The control samples can be method blanks fortified with surrogates (e.g., for organics), or LCS purchased commercially or prepared at the laboratory. The LCS is typically identified as blank spikes (BS) for organic analyses. For multi-analyte methods, the LCS or BS may contain only a representative number of target analytes rather than the full list.

The RPD for duplicate investigative sample analysis provides a tool for evaluating how well the method performed for the respective matrices.

Accuracy/Bias

Accuracy control limits are established by the analysis of control samples, which are water and/or solid/waste matrices. For organic analyses, the LCS may be a surrogate compound in the blank or a select number of target analytes in the BS. The LCS is subjected to all sample preparation steps. When available, a solid LCS may be analyzed to demonstrate control of the analysis for soil. The amount of each analyte recovered in an LCS analysis is recorded and entered into a database to generate statistical control limits. These empirical data are compared with available method reference criteria and available databases to establish control criteria.

The % R for spiked investigative sample analysis (e.g., matrix spike) provides a tool for evaluating how well the method worked for the matrix. These values are used by the USACE to assess a reported result within the context of the project DQOs. For results that are outside control limits provided as requirements in the SAP, corrective action appropriate to the project will be taken and the deviation will be noted in the case narrative accompanying the sample results. The %R is defined as follows:

$$\% R = \frac{(A_T - A_O)}{A_F} \times 100$$

Where:

AT = Total amount recovered in fortified sample

A0 = Amount recovered in unfortified sample

AF = Amount added to sample

Accuracy for some procedures is evaluated as the degree of agreement between a new set of results and a historical database or a table of acceptable criteria for a given parameter. This degree of agreement is measured as %D from the reference value and is primarily used by the laboratory as a means for documenting acceptability of continuing calibration.

The %D is calculated by expressing, as a percentage, the difference between the original value and new value relative to the original value. This method for precision measurement can be expressed by the formula:

$$\% D = \frac{C1 - C2}{C_1} \times 100$$

Where:

C1 = Concentration of analyte in the initial aliquot of the sample.

C2 = Concentration of analyte in replicate.

Completeness

Site-wide completeness goals account for all aspects of sample handling, from collection through data reporting. The level of completeness can be affected by loss or breakage of samples during transport, as well as external problems that prohibit collection of the sample. The following calculation is used for determining the percent complete:

$$\text{Completeness} = \frac{A}{B} \times 100$$

Where:

A = Number of usable data points.

B = Total number of data points collected.

The formula for sampling completeness is:

$$\text{Sampling Completeness} = \frac{\text{Number of locations sampled}}{\text{Number of planned sample locations}} \times 100$$

An example formula for analytical completeness is:

$$\text{VOC Analytical Completeness} = \frac{\text{Number of Usable Data Points}}{\text{Expected Number of Usable Data Points}} \times 100$$

The ability to meet or exceed completeness objectives is dependent on the nature of samples submitted for analysis.

The following table lists the completeness goals for a project. If the completeness goal is not met because of controllable circumstances, then the samples will be recollected and reanalyzed, as necessary, to meet the completeness objective. If the completeness goal is not met because of uncontrollable circumstances, such as inaccessible sample points, matrix interferences, etc., then the deficiency will be evaluated. Note that Project Completeness Goals apply separately to each study area environmental medium.

Project Completeness Goals

Task	Subtask	Completeness Goal
Sampling	Sample Collection	95% (per media)
Field Measurements	Conductivity	100% of collected samples (per media)
	pH/Turbidity/DO	100% of collected samples (per media)
Analytical Measurements	All Laboratory Analyses	95% of collected analytes (per media)
		80% of each target analyte (per media)

Representativeness

Data representativeness for a project is accomplished by implementing approved sampling procedures and analytical methods that are appropriate for the intended data uses, and which are established within this project-specific SAP.

Comparability

Comparability of data sets generated for a project will be obtained through the implementation of standard sampling and analysis procedures, by the use of traceable reference materials for laboratory standards, and by expressing the results in comparable concentration units.

Sensitivity

Sensitivity is the ability of the method or acceptable sensitivity instrument to detect the contaminant of concern and other target compounds at the level of interest. Quantitative MPC need to be determined for acceptable sensitivity to ensure that the quantitation limits can be routinely achieved for each matrix, analytical parameter, and concentration level. The use of standards and instrument calibration will enable the instrument to identify and differentiate between various compounds/analytes of interest and interferences.

Assessment of Data Usability

In addition, data assessment is considered the final step in the data evaluation process and can be performed only on data of known and documented quality. For a project, all data will be assessed for usability, regardless of the data evaluation/validation process implemented. As mentioned previously, data usability goes beyond validation because it evaluates the achievement of the DQOs based on the comparison of the specific WPs with the obtained results. The results of the data usability assessment, and particularly any changes to the DQOs necessitated by the data not meeting usability criteria, will be included in each final data quality assessment report. As noted in Worksheet #15, screening criteria for some analytes is below the LOD; however, if contaminants of concern are present, it is expected that they will be detected at concentrations that will exceed the LOD.

Primarily, the assessment of the usability will follow procedures described in appropriate USEPA guidance documents, particularly *Guidance for Data Usability in Risk Assessment* (Publication No. 9285.7-05FS, September 1992), and will be conducted according to the process outlined below.

Sampling and Analysis Activities Evaluation

The first step of the data usability evaluation will include a review of the sampling and analysis activities in comparison to Site-Wide data quality indicators (DQIs) and study-specific WPs. Specific limitations to the data, i.e., results that are qualified as estimated (J/UJ), or rejected (R), will be determined and documented in the database. The data acquisition and evaluation process consists of a series of procedures that were designed to maximize final data quality.

Assessment of DQIs

The second part of data usability pertains to the assessment of the program-specific DQIs. Each investigator will compare the performance achieved for each data quality criterion against the expected and planned performance. In general, this comparison will follow from the DQIs used to define each DQO. The comparison is the most critical component of the assessment process. Any deviation from planned performance will be documented and evaluated to determine whether corrective action is advisable. Potential corrective actions will range from resampling and/or reanalysis of data, to qualification or exclusion of the data for use in the data interpretation. In the event that corrective action is not possible, the limitations, if any, of the data with regard to achieving the DQOs will be noted.

In conjunction with the DQI achievement review, the investigators will need to make decisions for the use of qualified values, which are a consequence of the formalized evaluation/validation process. Data qualifiers will be applied to individual data results. Data usability decisions will be made based on the assessment of the usability of each of these results for the intended purpose. Evaluation will describe the uncertainty (e.g., bias, imprecision) of the qualified results. Cumulative QC exceedances from the DQIs may require technical judgment to determine the overall effect on the usability of the data. Decisions about usability of qualified data for use in risk assessment will be based on the USEPA document mentioned, which allows for the use of estimated values. Finally, data users may choose to determine final data usability qualifiers as a result of the overall examination and decision process.

Achievement of DQOs

The third step in the data usability process concerns achievement of the DQOs. After the data set has been assessed to be of known quality, data limitations have been documented, and overall result applicability/usability for its intended purpose has been determined, the final data assessment can be initiated by considering the answers to the following questions:

- Are the data adequate to determine the extent to which hazardous substances have migrated or to what extent they are expected to migrate from potential hazardous substance source areas?
- Do the data collected adequately characterize the nature and extent of potential hazardous substance source areas at the site?
- Are the data statistically adequate to allow evaluation on a per chemical and per media basis?
- Do the data collected allow assessment of hydrogeological factors, which may influence contaminant migration/distribution?
- Is the sample set sufficient to develop site-specific removal and disposal treatment methodologies?
- Have sufficient data been collected to evaluate how factors, including physical characteristics of the site and climate and water table fluctuations, affect contaminant fate and transport?
- Have sufficient data been collected to determine the toxicity, environmental fate, and other significant characteristics of each hazardous substance present?
- Has an adequate amount of information been gathered to determine groundwater characteristics and current and potential groundwater uses for locations close to the site?
- Is the data set sufficient to evaluate the potential extent and risk of future releases of hazardous substances, which may remain as residual contamination at the source facility?

The principal investigators, in conjunction with the project team, will formulate solutions if data gaps are found as a result of problems, biases, or trends in the analytical data or if conditions exist that were not anticipated in the development of the DQOs. It is particularly important that each data usability evaluation specifically address any limitations on the use of the data that may result from a failure to achieve the stipulated DQO.

Identify the personnel responsible for performing the usability assessment

Data validation will be coordinated by the AECOM Project Chemist and will be conducted by the AECOM data validation staff. Data usability will be assessed by the AECOM PM with the assistance of the AECOM Project Chemist.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies

The documentation generated during data validation will include a memorandum that describes the information reviewed, the results of this review, and a recommendation on data usability and limitations of specific data points. The memorandum provides information on the samples included in the review and the date they were collected, the condition of samples when received at the laboratory and any discrepancies noted during the receiving process, verification of sample preparation and analysis within the method specified holding time, review of associated QC analyses including blanks, LCSs, MSs, and field and/or laboratory duplicates. As a result of this review standard qualifiers are entered into the database so that data users can readily identify any limitations associated with a specific data point.

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Appendix A

Figures

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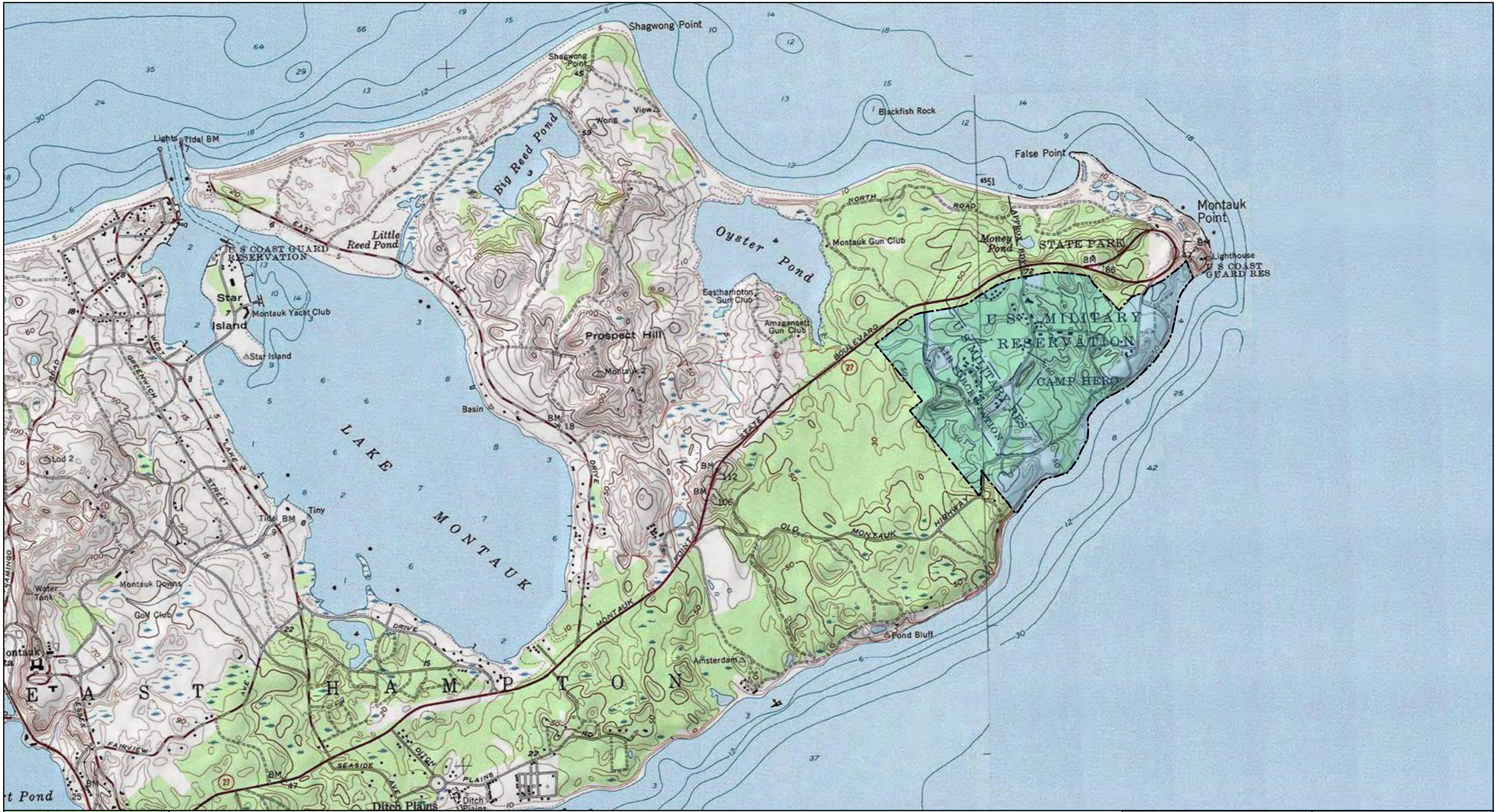

MAP LOCATION

NAD 1983 StatePlane Long Island FIPS 3104

Basemap Copyright:© 2013 National Geographic Society, i-cubed

N
W E
S

0 1,000 2,000
Feet
1 inch = 2,000 feet

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General Location Map

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	JB	April 2017	**Figure 10-1**

4/3/2017 1:24,000 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_10_1_General_Site_Loc.mxd

MAP LOCATION

Surface water features obtained from National Hydrography Dataset (NHD) Dates of publication vary.

Wetlands shapes from New York State Department of Environmental Conservation (NYSDEC).

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

4/18/2017 1:1,800 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_10_2_Site_Map.mxd

0 75 150 300 Feet

1 inch = 150 feet

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Site Map

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	JB	February 2017	**Figure 10-2**

AOC ID	AOC Name
10	Building 10
034	Former Building 34
107	Electrical Substation
112	Battery 112
201	Building 201
203	Building 203 (LNAPL)
203	Building 203 (broader impacts)
216	Battery 216
2010	Building 2010 (UST 30)
AGC1	AGC Site 1
AGC2	AGC Site 2
AGC3	Camp Hero State Park Bluffs / AGC Site 3
AGC4	AGC Site 4
AST35	AST-35 (H-13)
B113	Battery 113
EFO	Engineering Field Office
F100C	Building F100C (UST 34)
FPH	FPH for AST-35
H1	Drum Location (H-1)
H11	Former Power Plant (H-11)
H12	Sewage Ejector Station (H-12)
H14	Former Coal Storage (H-14)
H15	Former Coal Storage (H-15)
H16	Former Sewage Treatment Area (H-16)
H17	Open Pits (H-17)
H18	Drum Location (H-18)
H19	Former AST (H-19)
H2	Drum Location (H-2)
H20	Drum Location (H-20)
H21	Open Pits (H-21)
H22	Drum Site (H-22)
H3	Drum Site (H-3)
H4	Construction Debris Area (H-4)
H5	Drum Location with Construction Debris (H-5)
H6	Construction Debris Area (H-6)
H7	H-7 Boiler
H8	H-8 Boiler
H9	Possible Boiler (H-9)
MP	Motor Pool
P113	Plotting Room 113
STA	Building 20 (Tank A)
STB	Suspected Tank B
STC	Building 2 (Tank C)
STD	Building 104R (Tank D)
STE	Building 3001 (Tank E)
STF	Pump House (Tank F)
STG	Pump House (Tank G)
STH	Building 109 (Tank H)
WDS	WDS SB01 - SB03 Chlorine Contact Chamber
WDS	WDS SB04 - SB05 Septic Tank
WDS	WDS SB06 - SB07 Suspected Septic Tank
WDS	WDS SB08 - SB09 Box and Manhole
WDS	WDS SB10 Box
WDS	WDS SB11 Cesspool
WDS	WDS SB12 - SB13 Manholes
WDS	WDS SB14 - SB17 Cesspools
WDS	WDS SB18 - SB19
WDS	WDS SB20 Septic Tank

MAP LOCATION

Surface water features obtained from National Hydrography Dataset (NHD). Dates of publication vary.

Wetlands shapes from New York State Department of Environmental Conservation (NYSDEC).

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 75 150 300 Feet

1 inch = 150 feet

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Site Map with AOCs

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	JB	April 2017	**Figure 10-3**

4/18/2017 1:1,800 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXDs\Fig_10_3_Site_Map_with_AOCs.mxd

AOC ID	AOC Name
10	Building 10
034	Former Building 34
107	Electrical Substation
112	Battery 112
201	Building 201
203	Building 203 (LNAPL)
203	Building 203 (broader impacts)
216	Battery 216
2010	Building 2010 (UST 30)
AGC1	AGC Site 1
AGC2	AGC Site 2
AGC3	Camp Hero State Park Bluffs / AGC Site 3
AGC4	AGC Site 4
AST35	AST-35 (H-13)
B113	Battery 113
EFO	Engineering Field Office
F100C	Building F100C (UST 34)
FPH	FPH for AST-35
H1	Drum Location (H-1)
H11	Former Power Plant (H-11)
H12	Sewage Ejector Station (H-12)
H14	Former Coal Storage (H-14)
H15	Former Coal Storage (H-15)
H16	Former Sewage Treatment Area (H-16)
H17	Open Pits (H-17)
H18	Drum Location (H-18)
H19	Former AST (H-19)
H2	Drum Location (H-2)
H20	Drum Location (H-20)
H21	Open Pits (H-21)
H22	Drum Site (H-22)
H3	Drum Site (H-3)
H4	Construction Debris Area (H-4)
H5	Drum Location with Construction Debris (H-5)
H6	Construction Debris Area (H-6)
H7	H-7 Boiler
H8	H-8 Boiler
H9	Possible Boiler (H-9)
MP	Motor Pool
P113	Plotting Room 113
STA	Building 20 (Tank A)
STB	Suspected Tank B
STC	Building 2 (Tank C)
STD	Building 104R (Tank D)
STE	Building 3001 (Tank E)
STF	Pump House (Tank F)
STG	Pump House (Tank G)
STH	Building 109 (Tank H)
WDS	WDS SB01 - SB03 Chlorine Contact Chamber
WDS	WDS SB04 - SB05 Septic Tank
WDS	WDS SB06 - SB07 Suspected Septic Tank
WDS	WDS SB08 - SB09 Box and Manhole
WDS	WDS SB10 Box
WDS	WDS SB11 Cesspool
WDS	WDS SB12 - SB13 Manholes
WDS	WDS SB14 - SB17 Cesspools
WDS	WDS SB18 - SB19
WDS	WDS SB20 Septic Tank

Surface water features obtained from National Hydrography Dataset (NHD). Dates of publication vary.

Wetlands shapes from New York State Department of Environmental Conservation (NYSDEC).

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 75 150 300 Feet
1 inch = 150 feet

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Site Map with Decision Units

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	JB	April 2017	Figure 10-4

ID	Decision Unit Name
DU01	Building 203 Area
DU02	H2 Drum Area
DU03	H1 Drum Area
DU04	H18 Drum Area
DU05	WDS Cesspool Area
DU06	Former Power Plant Area
DU07	H19, H20 AST/Drum Area
DU08	WDS Chlorine Contact Chamber Area
DU09	H15 Coal Storage Area
DU10	H5 Drum/Debris Area
DU11	H16/WDS Septic/former Building 34 Area
DU12	WDS Manhole Area 1
DU13	H14 Coal Storage Area
DU14	WDS Septic Tank Area
DU15	H6 Debris Area
DU16	WDS Manhole Area 2
DU17	H4 Debris Area
DU18	H3 Drum Storage Area

MAP LOCATION

Surface water features obtained from National Hydrography Dataset (NHD) Dates of publication vary.

Wetlands shapes from New York State Department of Environmental Conservation (NYSDEC).

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Note
Proposed surface water and sediment locations CH-SWSD001 through 030 are upstream background/reference sampling locations.

0 75 150 300 Feet
1 inch = 150 feet

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Proposed Phase III RI Sampling Locations
Sitewide Surface Water and Sediment
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	JB	April 2017	**Figure 17-1**

4/18/2017 1:1,800 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_1_Prop_Phase_III RI_Sampling_Loc_Sitewide_Surface_Water_Sediment.mxd

ID	Decision Unit Name
DU01	Building 203 Area
DU02	H2 Drum Area
DU03	H1 Drum Area
DU04	H18 Drum Area
DU05	WDS Cesspool Area
DU06	Former Power Plant Area
DU07	H19, H20 AST/Drum Area
DU08	WDS Chlorine Contact Chamber Area
DU09	H15 Coal Storage Area
DU10	H5 Drum/Debris Area
DU11	H16/WDS Septic/former Building 34 Area
DU12	WDS Manhole Area 1
DU13	H14 Coal Storage Area
DU14	WDS Septic Tank Area
DU15	H6 Debris Area
DU16	WDS Manhole Area 2
DU17	H4 Debris Area
DU18	H3 Drum Storage Area

Camp Hero Built Features

- Proposed Groundwater Monitoring Well
- Existing Groundwater Monitoring Well
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - No Exceedance
- Subsurface Soil - Exceedance
- Decision Unit
- AGC Site (NFA)
- State Park Bluffs (NFA)

Buildings
- Existing Building
- Former Building

Restricted Areas
- Area H
- Area K

State Park Trails
- Battery 112 Trail
- Battery 113 Trail
- Paumanok Path

State Park Areas
- Camping
- Picnic
- Fence
- Road

Sanitary Sewer System
- Primary Sanitary Sewer Line
- Secondary WDS Line
- Septic Lines
- Drain Tilefields
- Septic Tank
- Other
- Manhole
- Box (cleanout or other)
- Cesspool

MAP LOCATION (NY, CT, RI, MA, PA, NJ, Camp Hero)

Surface water features obtained from National Hydrography Dataset (NHD) Dates of publication vary.

Wetlands shapes from New York State Department of Environmental Conservation (NYSDEC).

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Note
Groundwater monitoring wells CH-MW001 through 015 are existing wells that represent background groundwater sampling locations.

0 75 150 300 Feet
1 inch = 150 feet

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Proposed Phase III RI Sampling Locations
Sitewide Groundwater Monitoring Well Network
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO. 60443903 | PREPARED BY JB | DATE April 2017 | **Figure 17-2**

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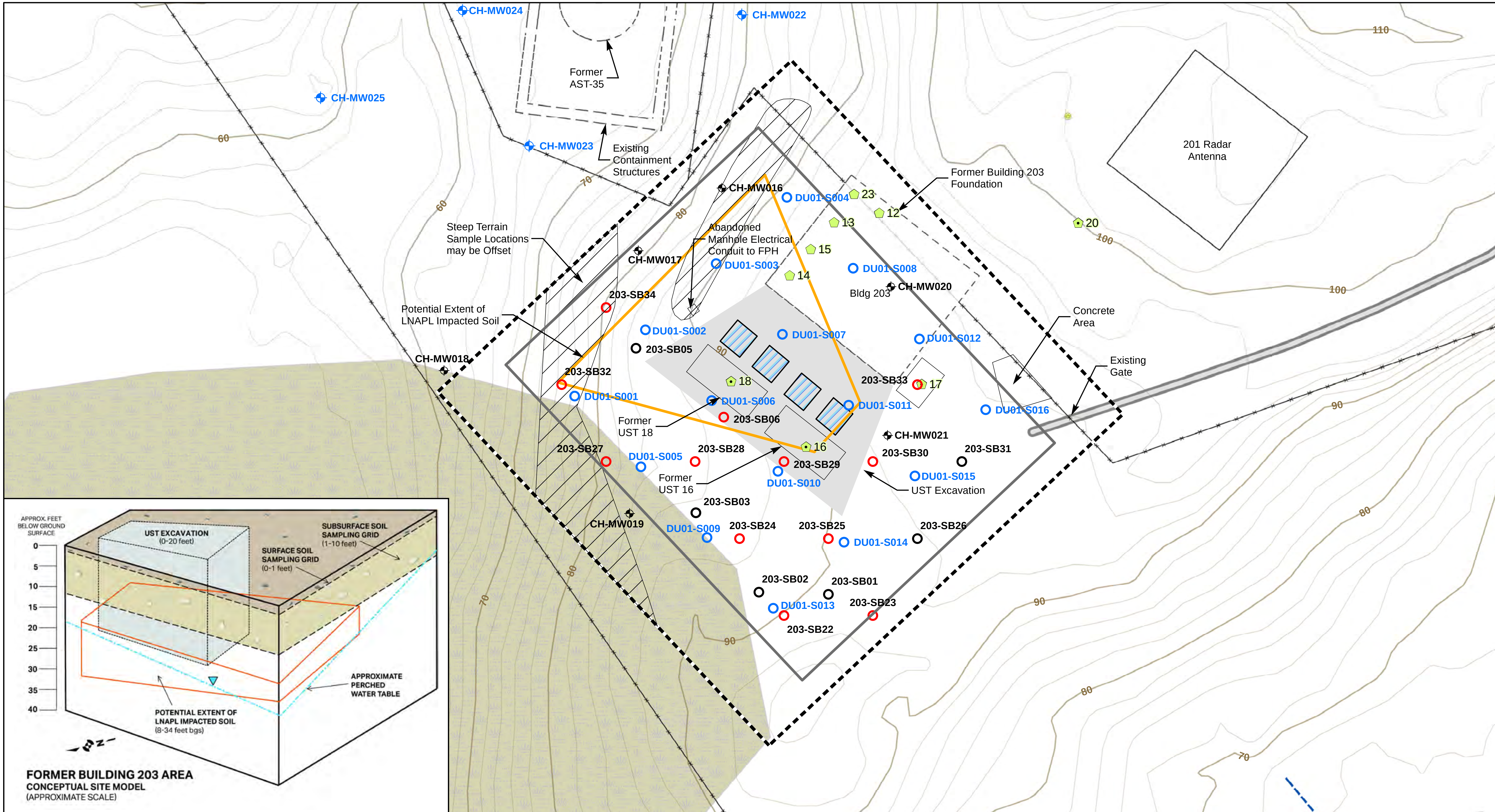

MAP LOCATION

Camp Hero Built Features

- Proposed Subsurface Soil Sample Location
- Subsurface Soil - No Exceedance
- Subsurface Soil - Exceedance
- Decision Unit

Storage Tanks

- AST (closed)
- UST (closed)
- AST to be Investigated

- Fence
- Cesspool

Topographic Contours

- 10 ft
- 2 ft

- Former Radiators
- Limited Accessibility
- Prior Phase II RI Surface Soil Sampling Grid

Camp Hero Natural

DEC Wetlands

- Class 2

Surface Water

- Intermittent Drainage without

N E S W

0 20 40 Feet

1 inch = 40 feet

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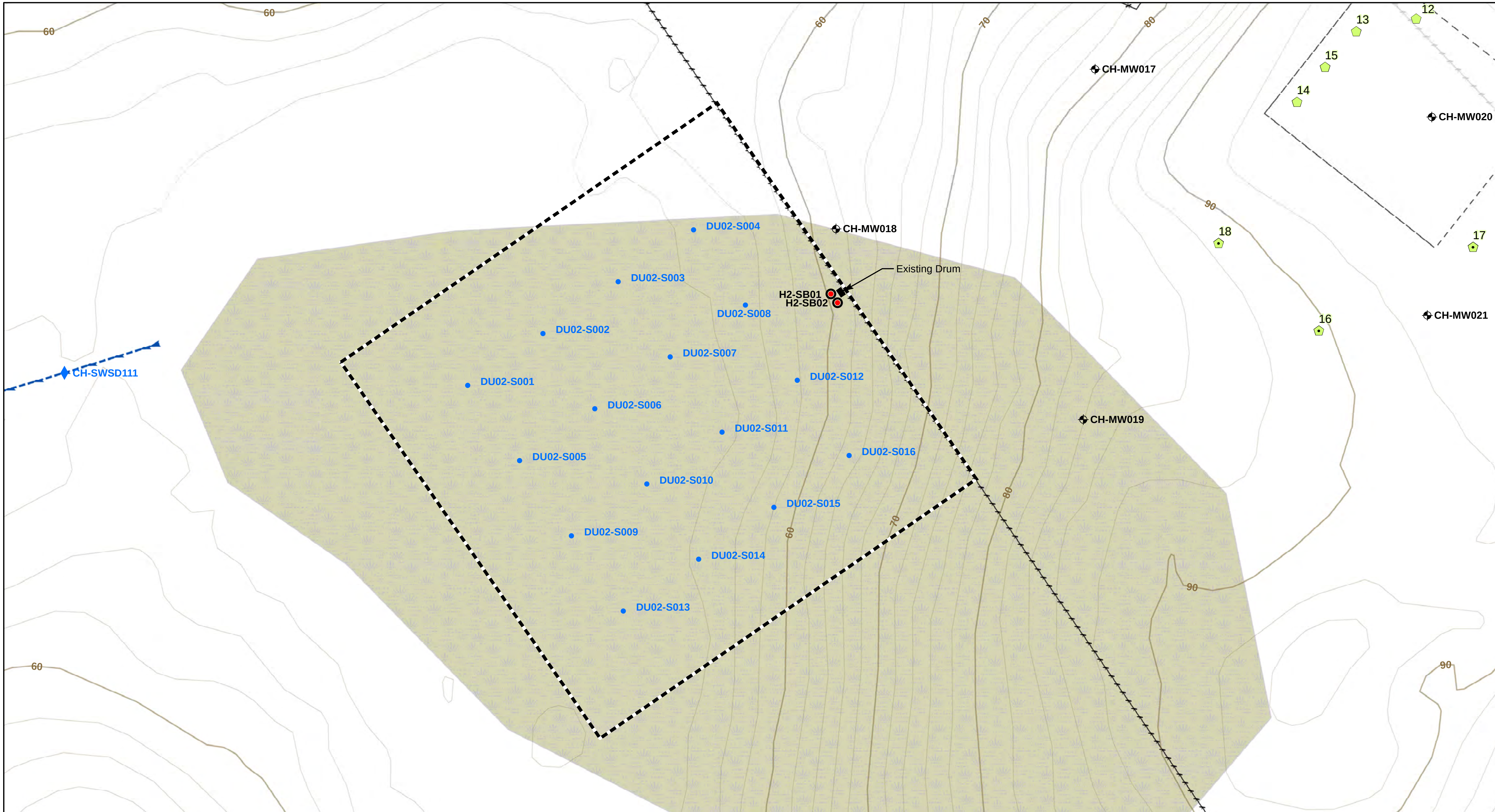
Proposed Phase III RI Sampling Locations
DU01, Building 203 Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-3**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_3_DU01_Building_203_Area.mxd




MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Surface Water and Sediment Sampling Location
- Surface Soil - Exceedance
- Subsurface Soil - No Exceedance

Decision Unit

Storage Tanks

- AST (closed)
- UST (closed)

Fence

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

DEC Wetlands

Class 2

Surface Water

Intermittent Drainage without Revetment

0 15 30 Feet

1 inch = 30 feet

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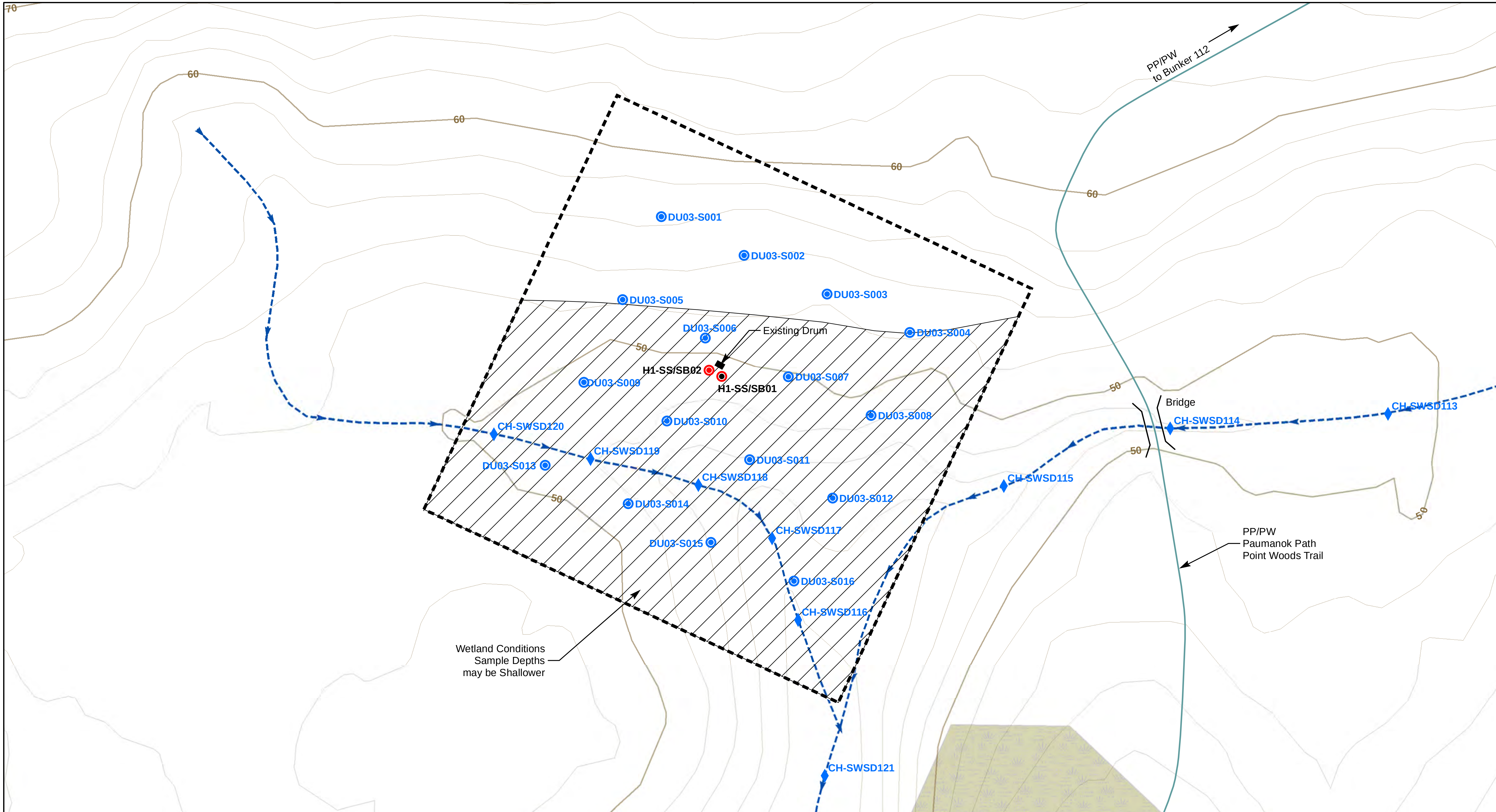
Proposed Phase III RI Sampling Locations
DU02, H2 Drum Area
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-4**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_4_DU02_H2_Drum_Area.mxd



MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Proposed Surface Water and Sediment Sampling Location
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - Exceedance
- Decision Unit
- Limited Accessibility

State Park Trails

- Paumanok Path

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

DEC Wetlands

- Class 2
- Intermittent Drainage without Revetment

Surface water features obtained from National Hydrography Dataset (NHD) Dates of publication vary.

N W E S

0 15 30 Feet

1 inch = 30 feet

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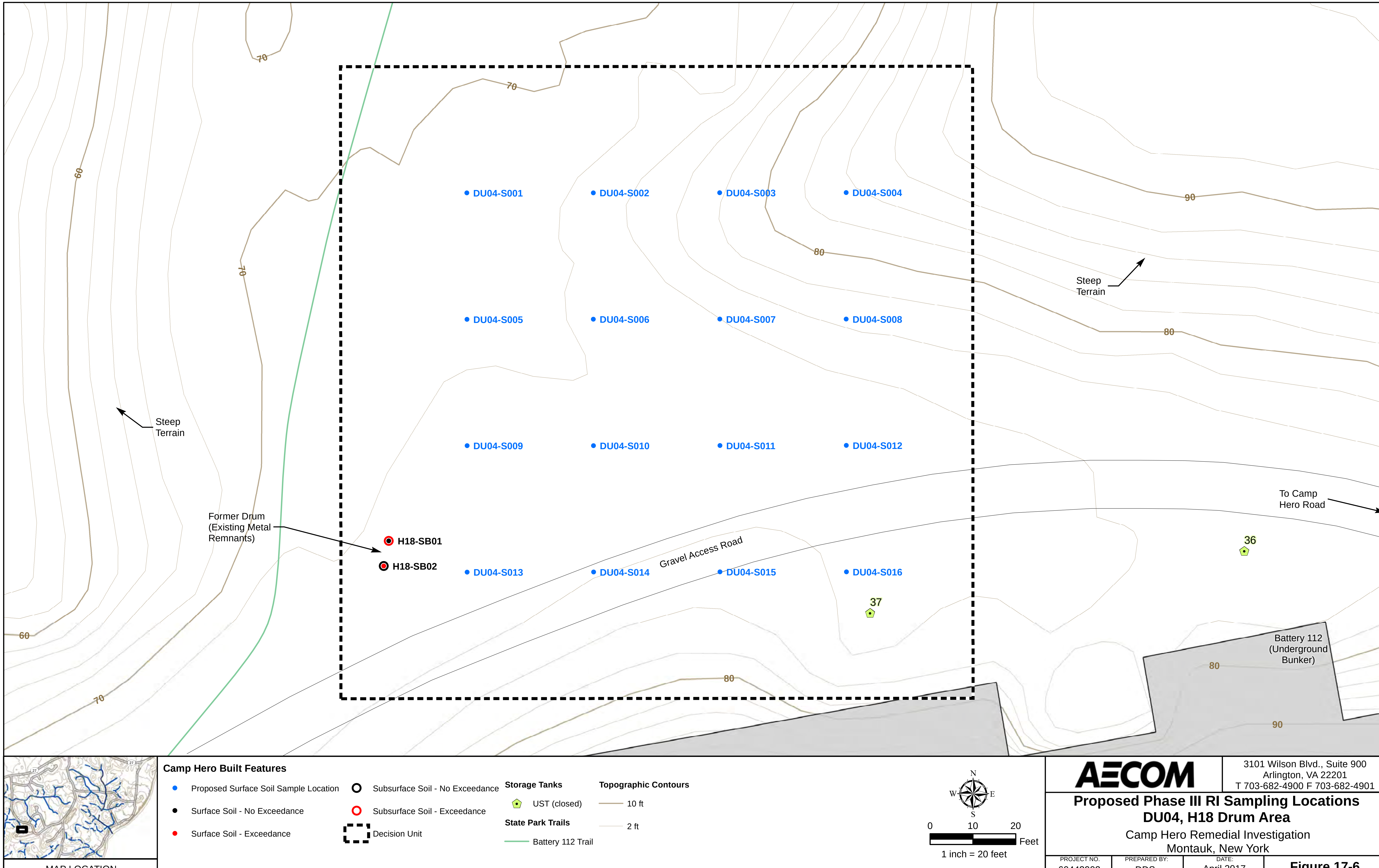
Proposed Phase III RI Sampling Locations
DU03, H1 Drum Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2017	**Figure 17-5**

5/2/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_5_DU03_H1_Drum_Area.mxd



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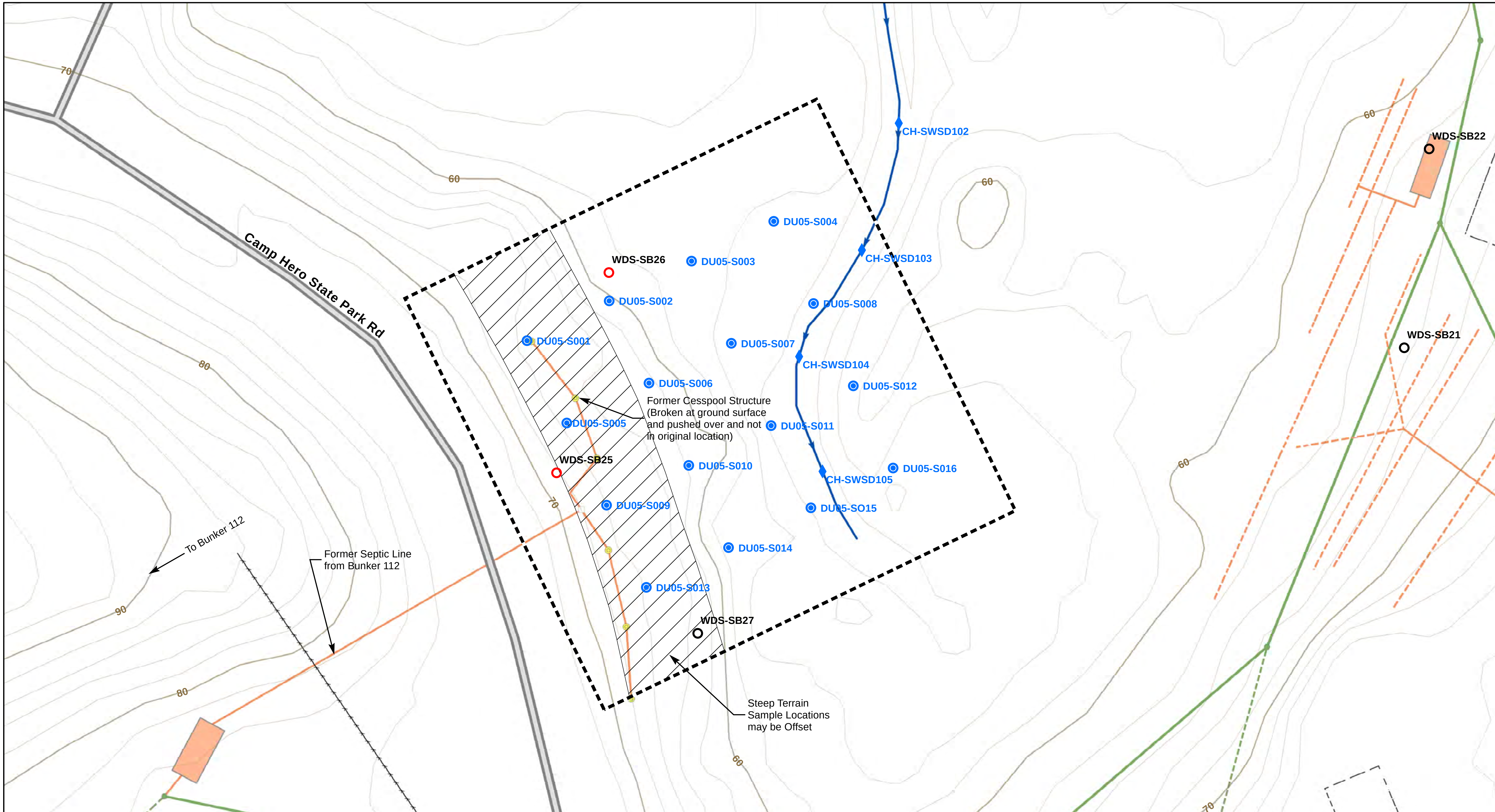
Proposed Phase III RI Sampling Locations
DU04, H18 Drum Area
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-6**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_6_DU04_H18_Drum_Area.mxd



MAP LOCATION

Camp Hero Built Features

- Proposed_Surface_Soil_Sample_Loc
- Proposed Subsurface Soil Sample Location
- Proposed Surface Water and Sediment Sampling Location
- Subsurface Soil - No Exceedance
- Subsurface Soil - Exceedance
- Decision Unit
- Limited Accessibility
- Fence

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Septic Lines
- Drain Tilefields
- Septic Tank
- Manhole
- Box (cleanout or other)
- Cesspool

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

- Intermittent Drainage with Revetment

0 15 30 Feet

1 inch = 30 feet

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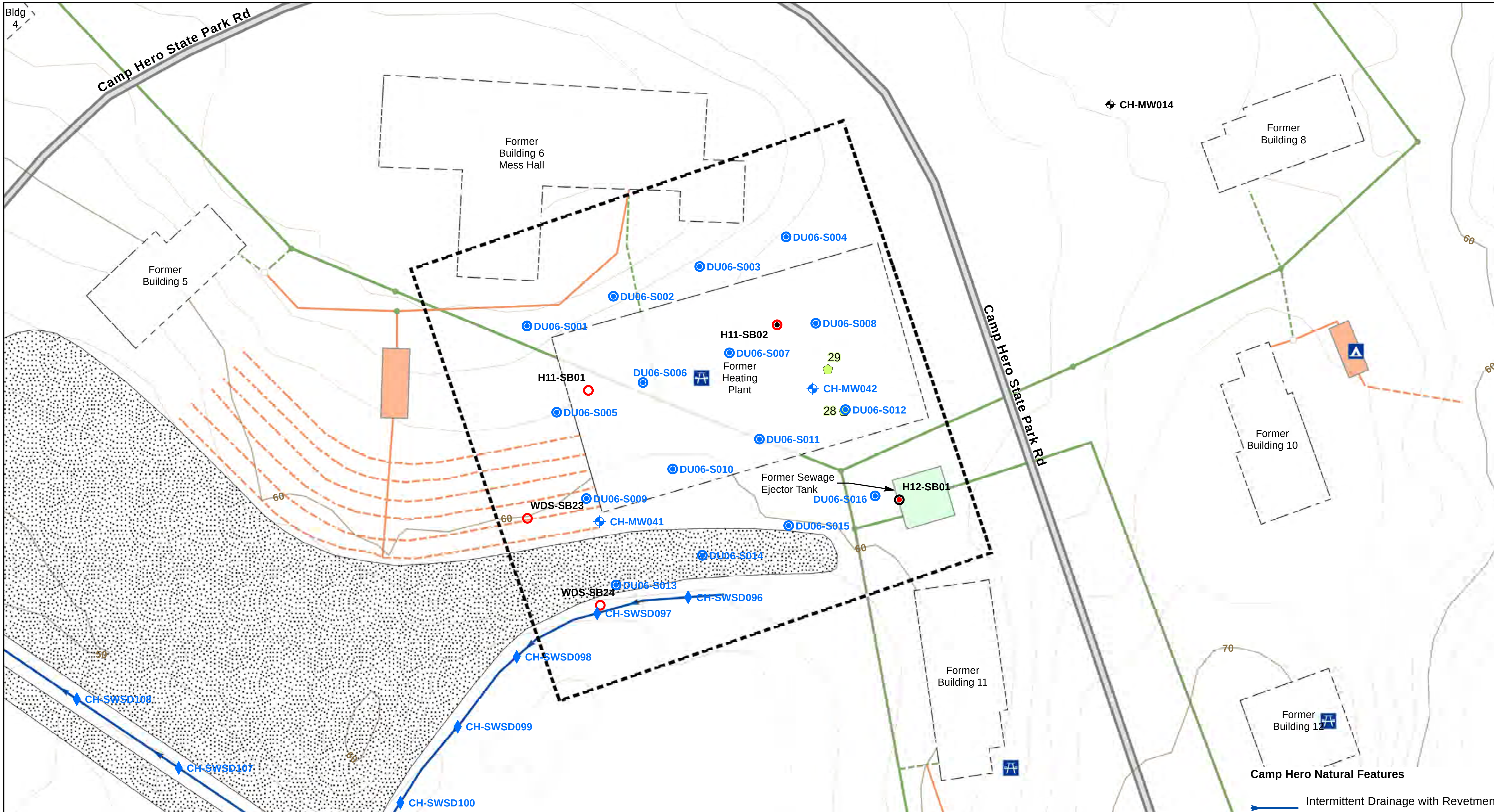
Proposed Phase III RI Sampling Locations
DU05, WDS Cesspool Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-7**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_7_DU05_WDS_Cesspool_Area.mxd



MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Proposed Surface Water and Sediment Sampling Location
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - No Exceedance
- Subsurface Soil - Exceedance
- Decision Unit

Storage Tanks

- AST (closed)

State Park Areas

- Camping
- Picnic

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Septic Lines
- Drain Tilefields
- Septic Tank
- Sewage Ejector Tank
- Manhole
- Box (cleanout or other)

Topographic Contours

- 10 ft
- 2 ft
- Coal Fragments

0 15 30 Feet

1 inch = 30 feet

N W E S

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Proposed Phase III RI Sampling Locations
DU06, Former Power Plant Area

Camp Hero Remedial Investigation
Montauk, New York

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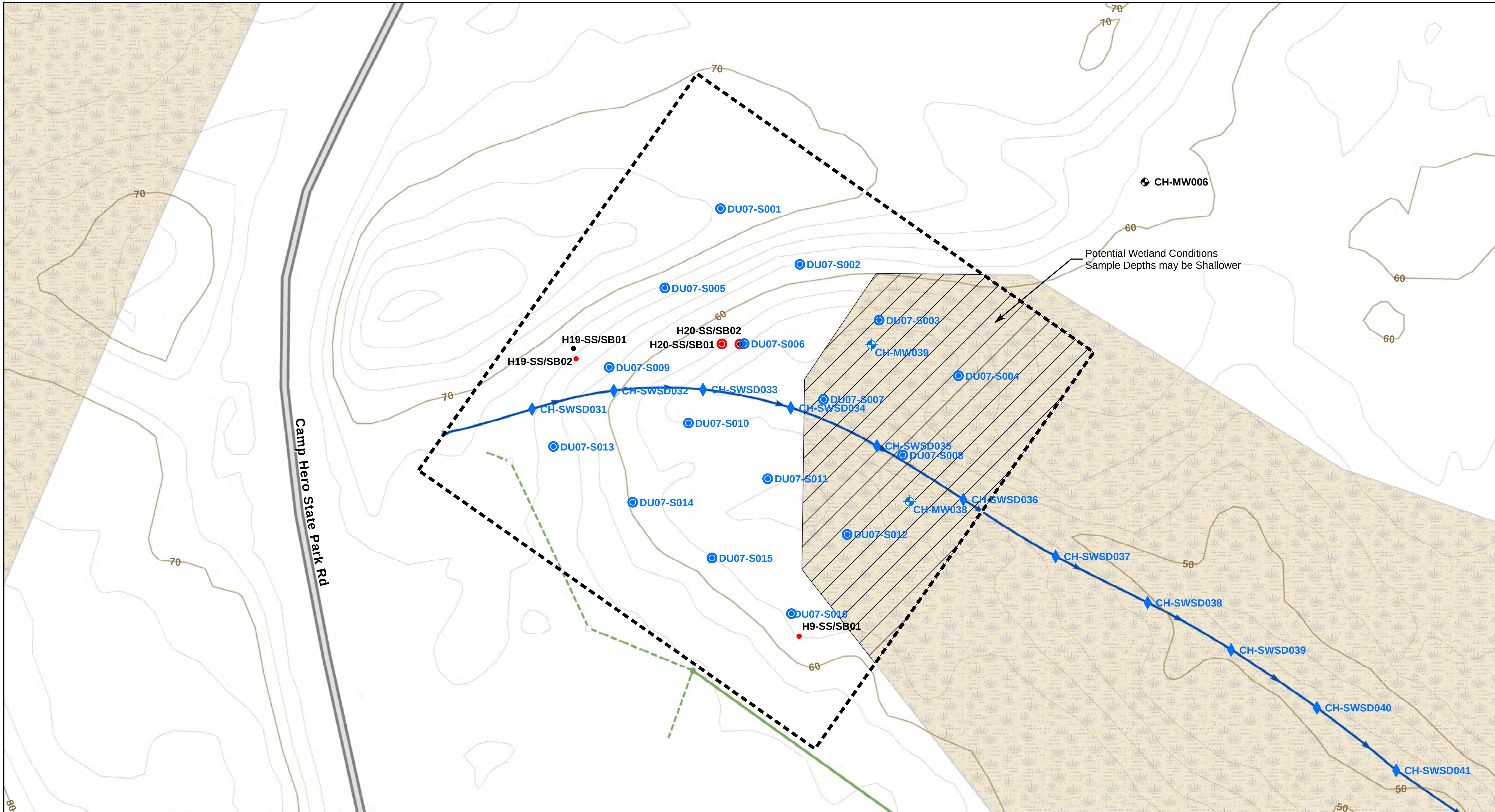
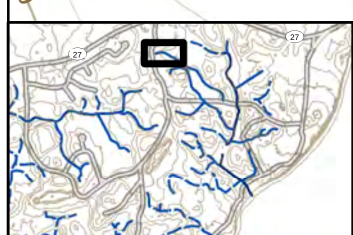
60443903	DDS	April 2017	**Figure 17-8**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_8_DU06_WDS_Tile_Leach_Field_Area.mxd





MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Proposed Groundwater Monitoring Well
- Proposed Surface Water and Sediment Sampling Location
- Existing Groundwater Monitoring Well
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - Exceedance
- Decision Unit

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Manhole
- Box (cleanout or other)

Topographic Contours

- 10 ft
- 2 ft
- Limited Accessibility

Camp Hero Natural Features

DEC Wetlands

- Class 1
- Intermittent Drainage with Revetment

N W E S

0 20 40 Feet

1 inch = 40 feet

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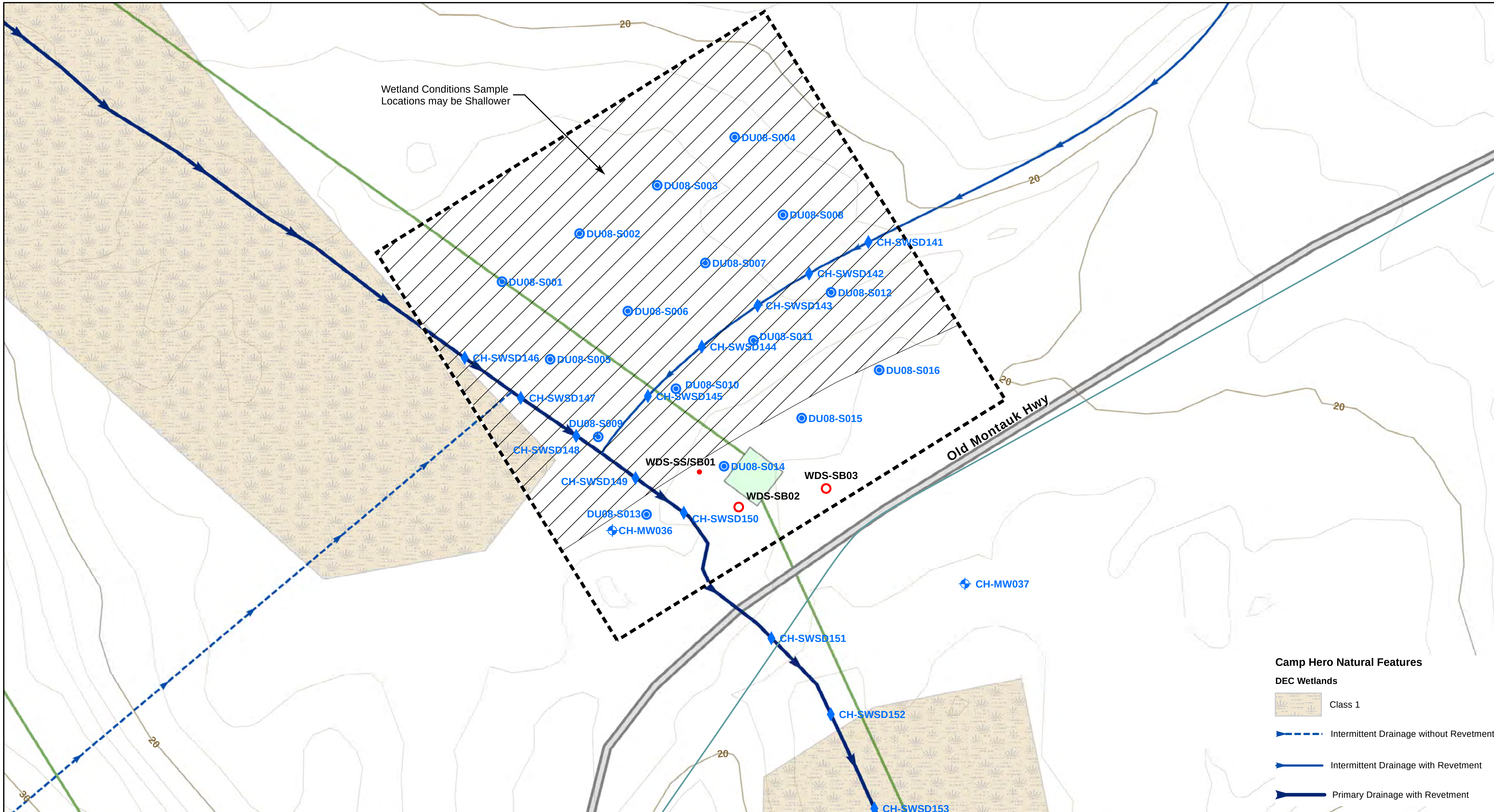
Proposed Phase III RI Sampling Locations
DU07, H19, H20 AST/Drum Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	Figure 17-9

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_9_DU07_H19_H20_AST_Drum_Area.mxd



MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Proposed Groundwater Monitoring Well
- Proposed Surface Water and Sediment Sampling Location
- Surface Soil - Exceedance
- Subsurface Soil - Exceedance
- Decision Unit
- Limited Accessibility

State Park Trails

- Paumanok Path

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line

- Other

Topographic Contours

- 10 ft
- 2 ft

0 15 30 Feet

1 inch = 30 feet

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Proposed Phase III RI Sampling Locations DU08, WDS Chlorine Contact Chamber Area

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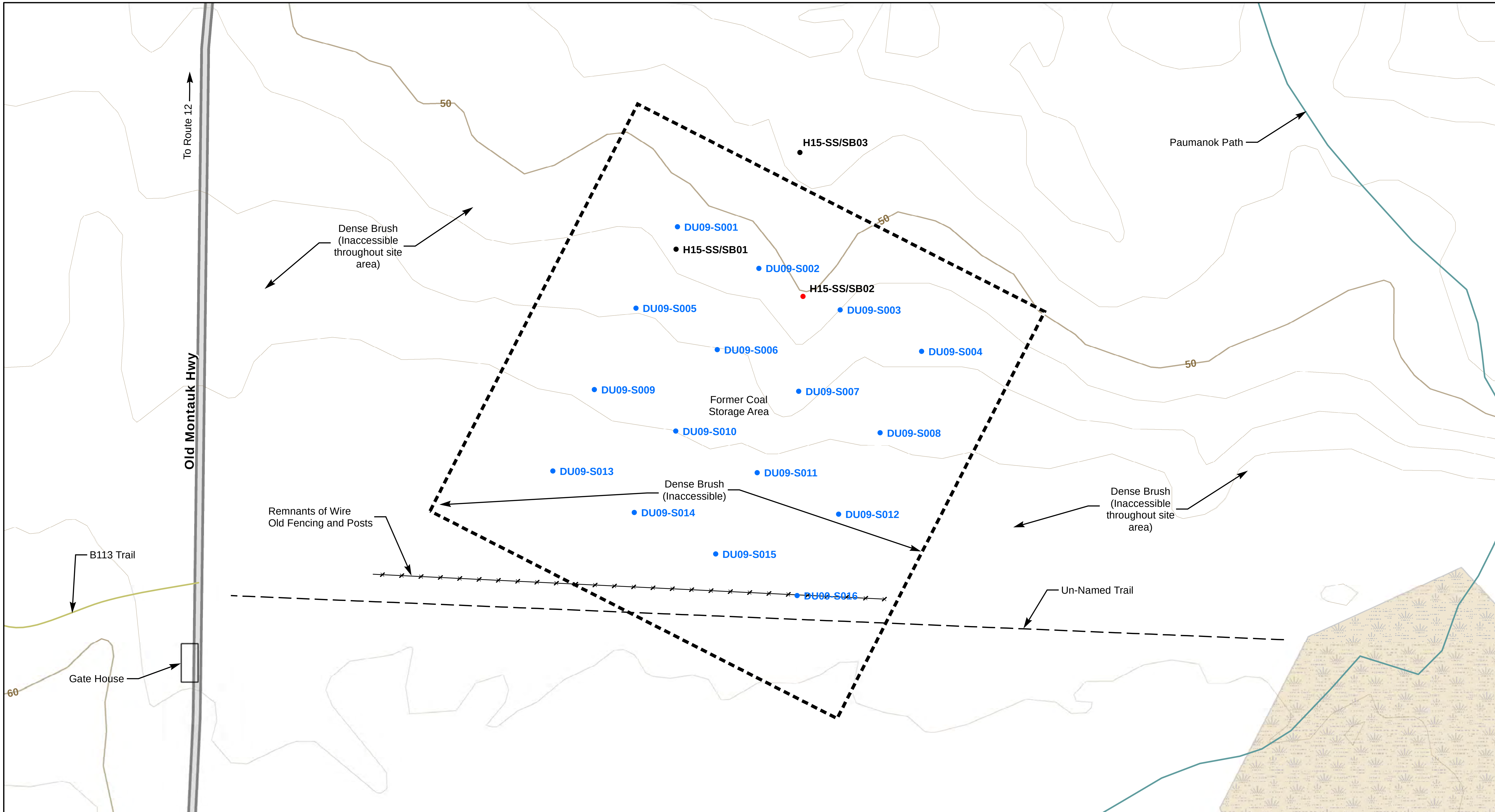
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	Figure 17-10

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_10_DU08_WDS_Chlorine_Contact_Chamber_Area.mxd



MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Surface Soil - No Exceedance
- Surface Soil - Exceedance

Decision Unit

State Park Trails

- Battery 113 Trail
- Paumanok Path

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

DEC Wetlands

- Class 1

N W E S

0 15 30 Feet

1 inch = 30 feet

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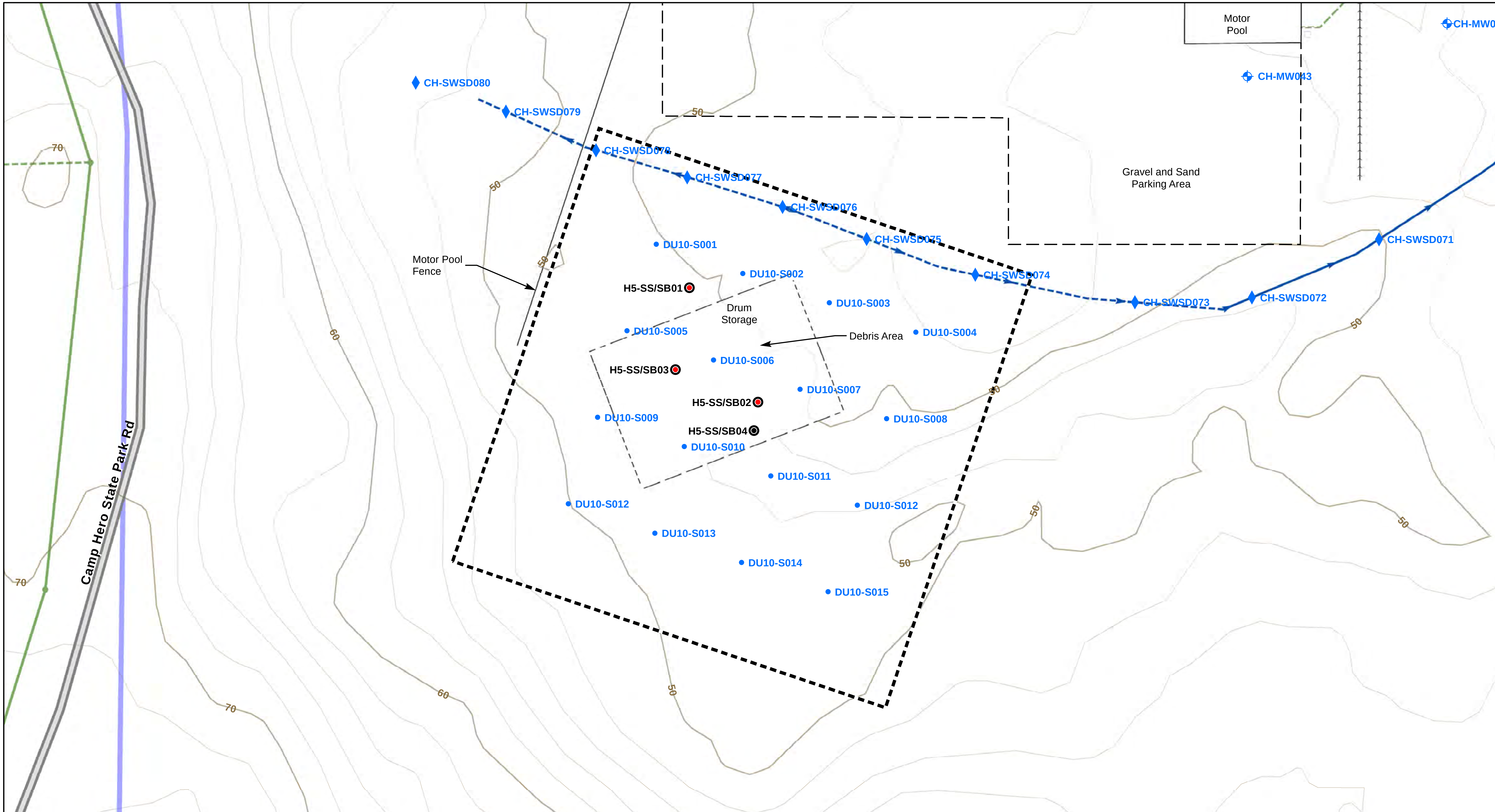
Proposed Phase III RI Sampling Locations
DU09, Coal Storage Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-11**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_11_DU09_Coal_Storage_Area.mxd



MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Groundwater Monitoring Well
- Proposed Surface Water and Sediment Sampling Location
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - No Exceedance
- Decision Unit
- Fence

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Manhole
- Box (cleanout or other)

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

- Surface Water Divide
- Intermittent Drainage without Revetment
- Intermittent Drainage with Revetment

0 15 30 Feet

1 inch = 30 feet

N E S W

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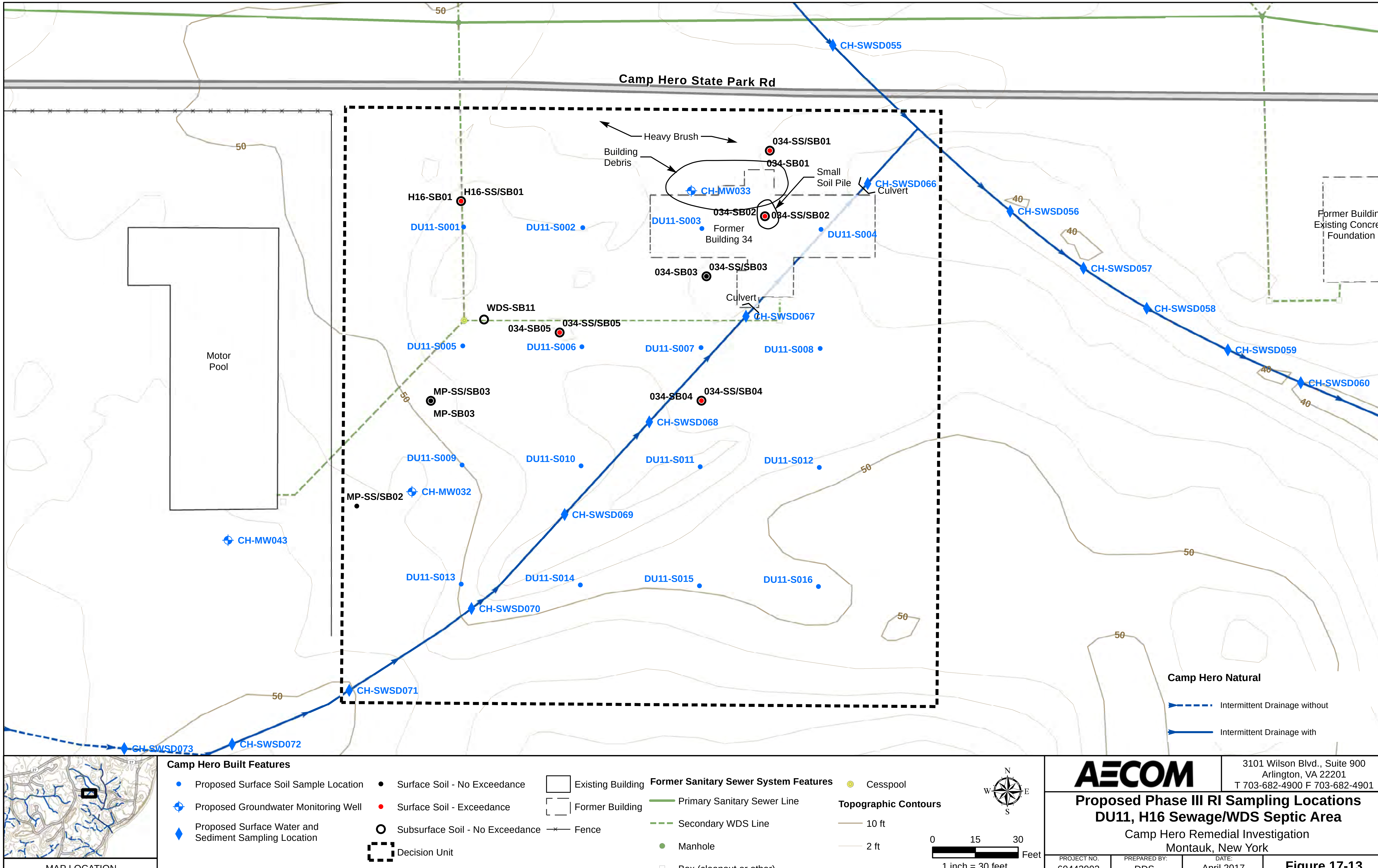
Proposed Phase III RI Sampling Locations
DU10, H5 Drum/Debris Area

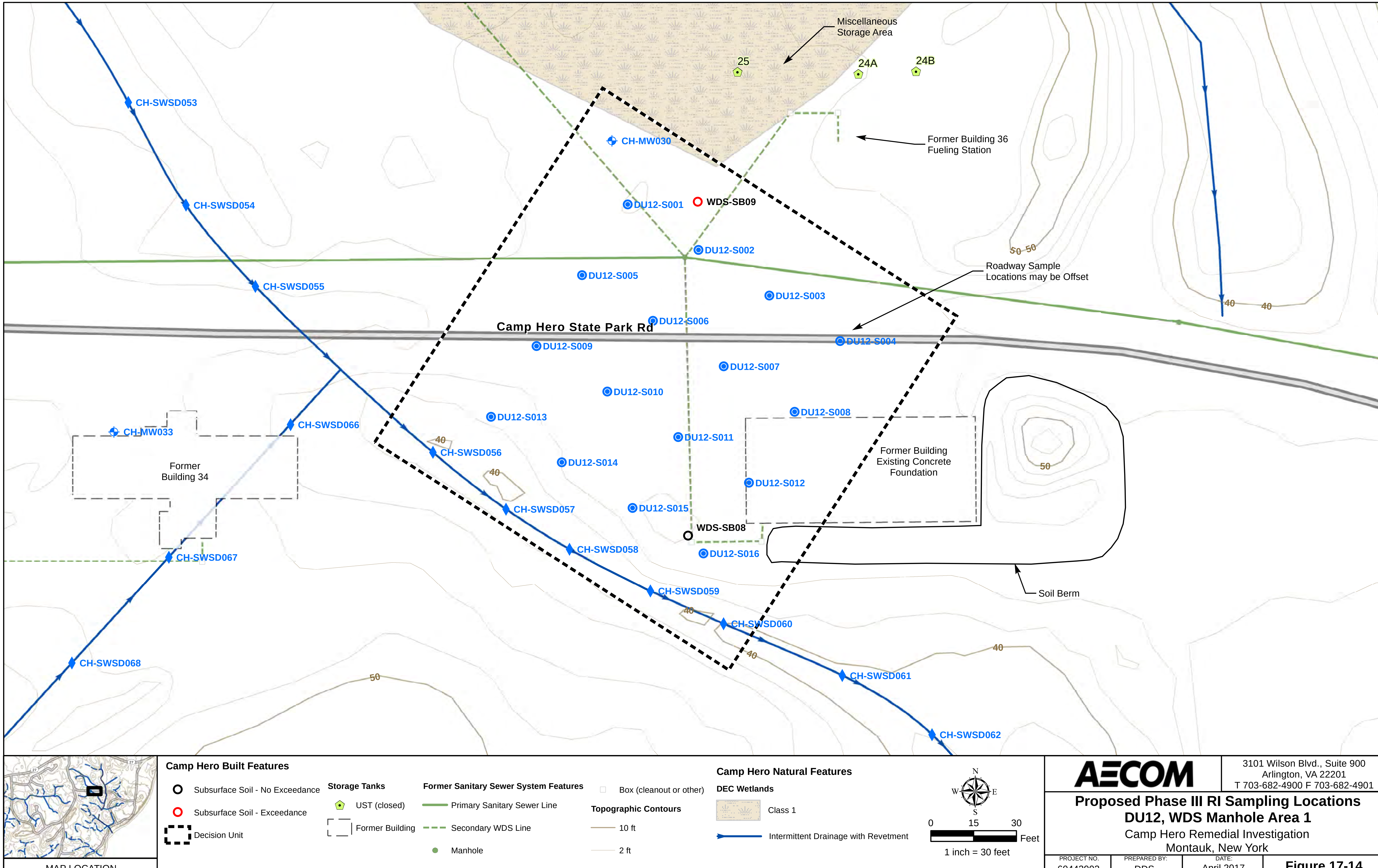
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-12**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_12_DU10_H5_Drum_Debris_Area.mxd



4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_13_DU11_H16_Sewage_WDS_Septic_Area.mxd



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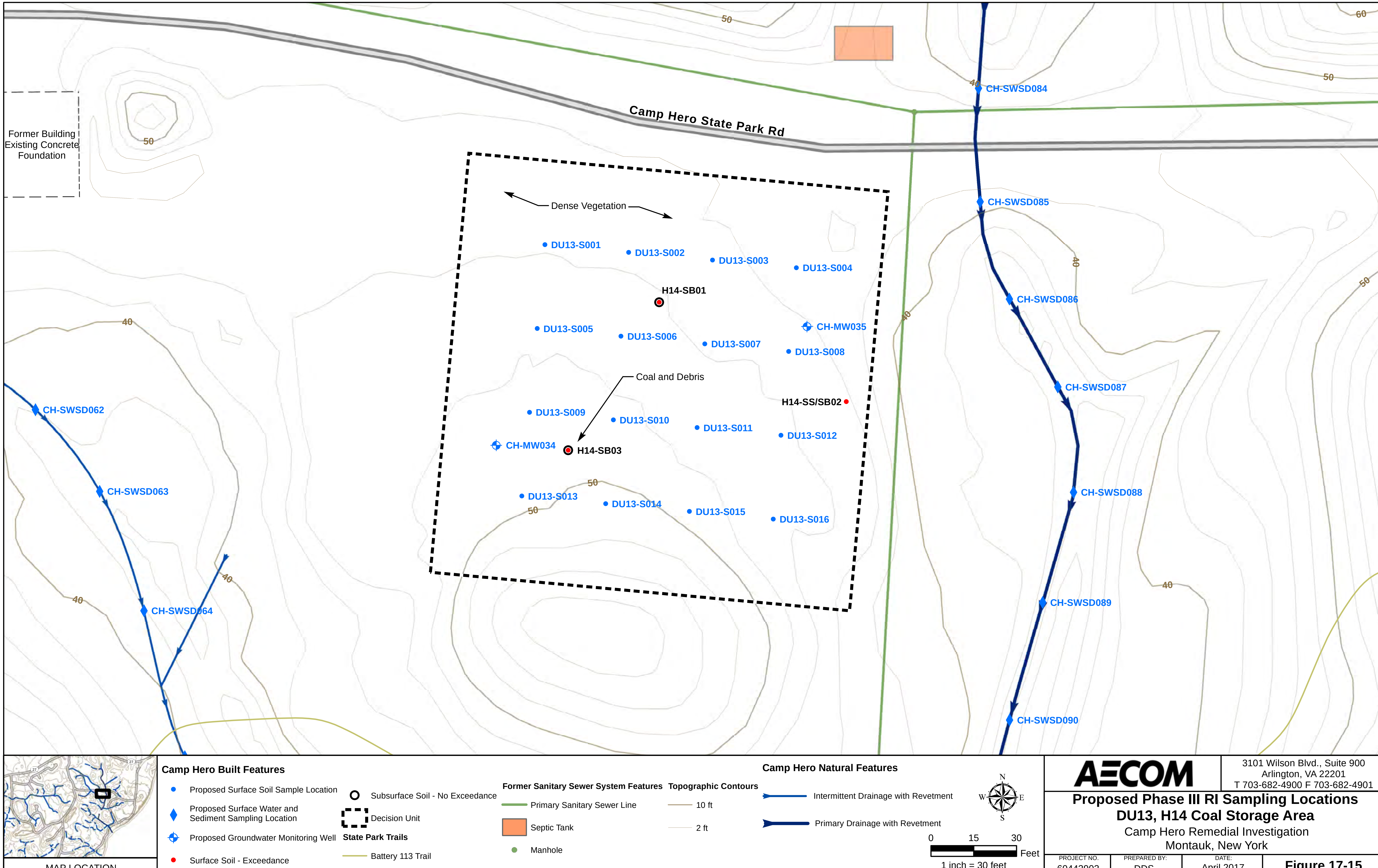
Proposed Phase III RI Sampling Locations
DU12, WDS Manhole Area 1

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-14**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_14_DU12_WDS_Manhole_Area_1.mxd



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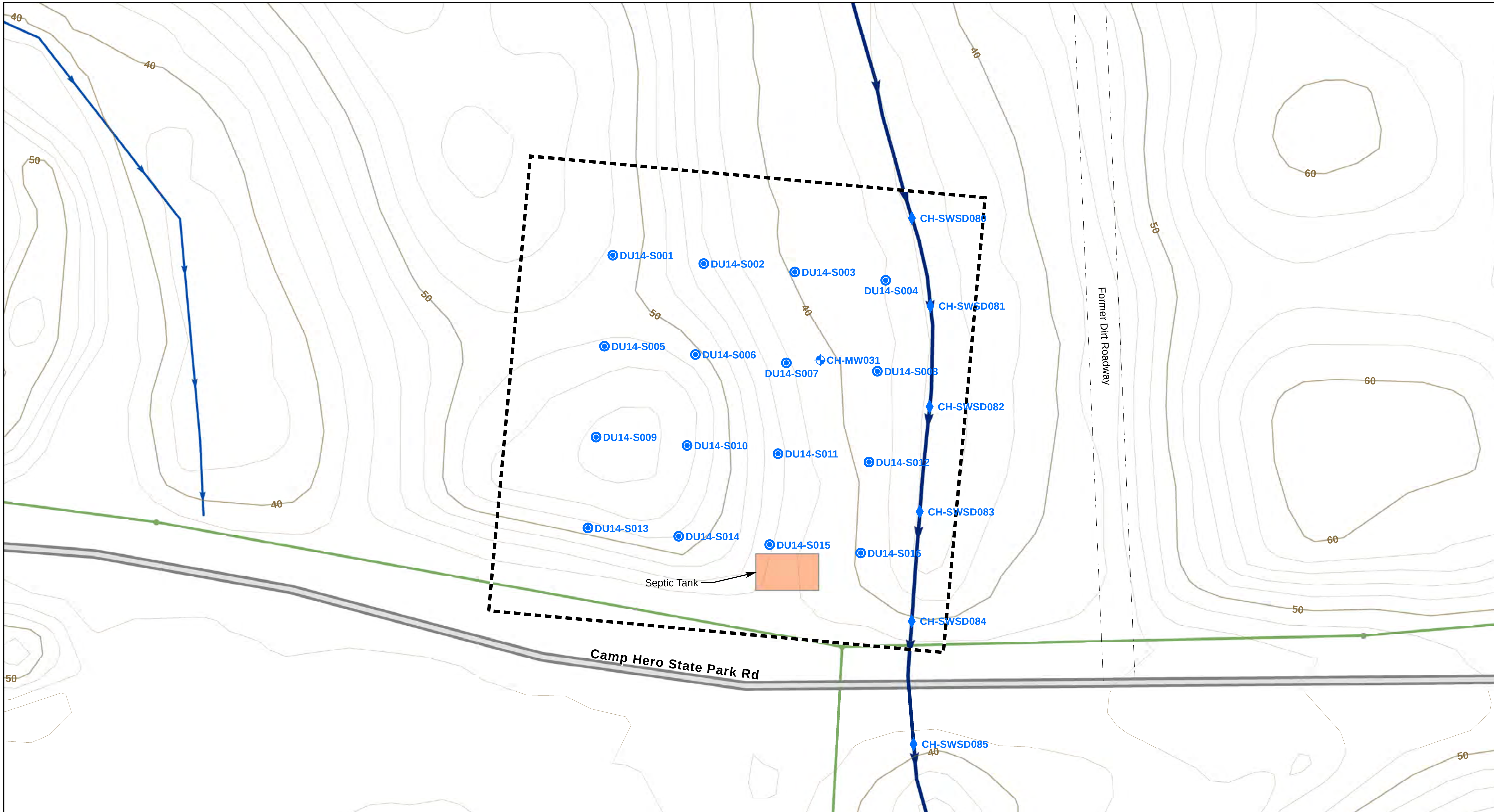
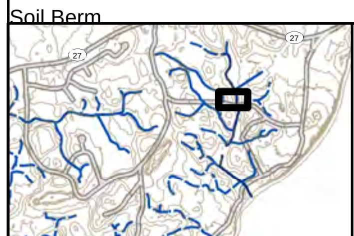
Proposed Phase III RI Sampling Locations
DU13, H14 Coal Storage Area
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-15**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_15_DU13_H14_Coal_Storage_Area.mxd





Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Proposed Groundwater Monitoring Well
- Proposed Surface Water and Sediment Sampling Location

Decision Unit

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Manhole

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural

- Primary Drainage with
- Intermittent Drainage with

0 15 30 Feet

1 inch = 30 feet

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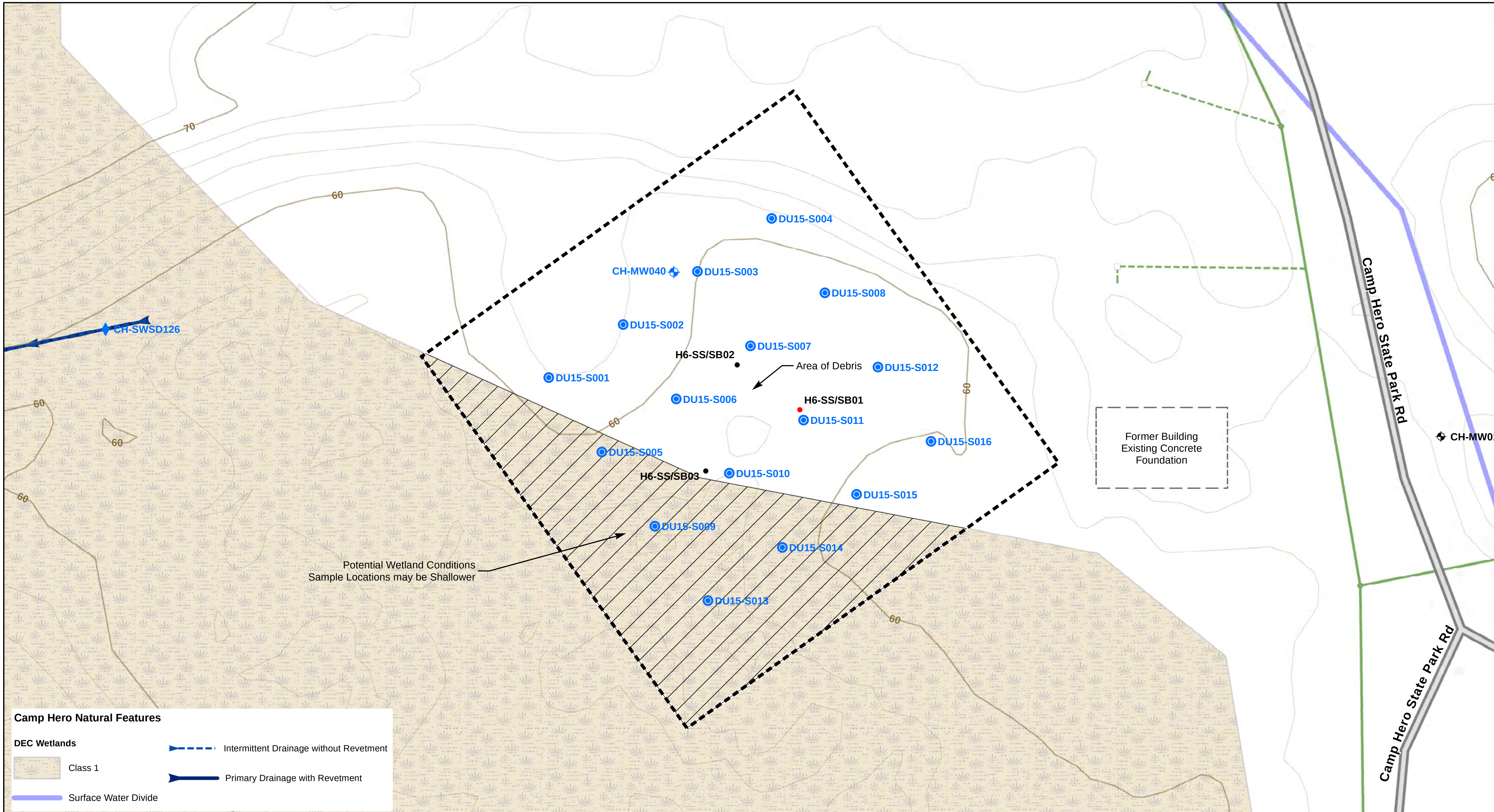
Proposed Phase III RI Sampling Locations
DU14, WDS Septic Tank Area 2
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-16**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_16_DU14_WDS_Septic_Tank_Area_2.mxd



Camp Hero Natural Features

DEC Wetlands

Class 1

Intermittent Drainage without Revetment

Primary Drainage with Revetment

Surface Water Divide

MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Proposed Surface Water and Sediment Sampling Location
- Proposed Groundwater Monitoring Well
- Existing Groundwater Monitoring Well
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Decision Unit

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Manhole
- Box (cleanout or other)

Topographic Contours

- 10 ft
- 2 ft
- Limited Accessibility

N S E W

0 15 30 Feet

1 inch = 30 feet

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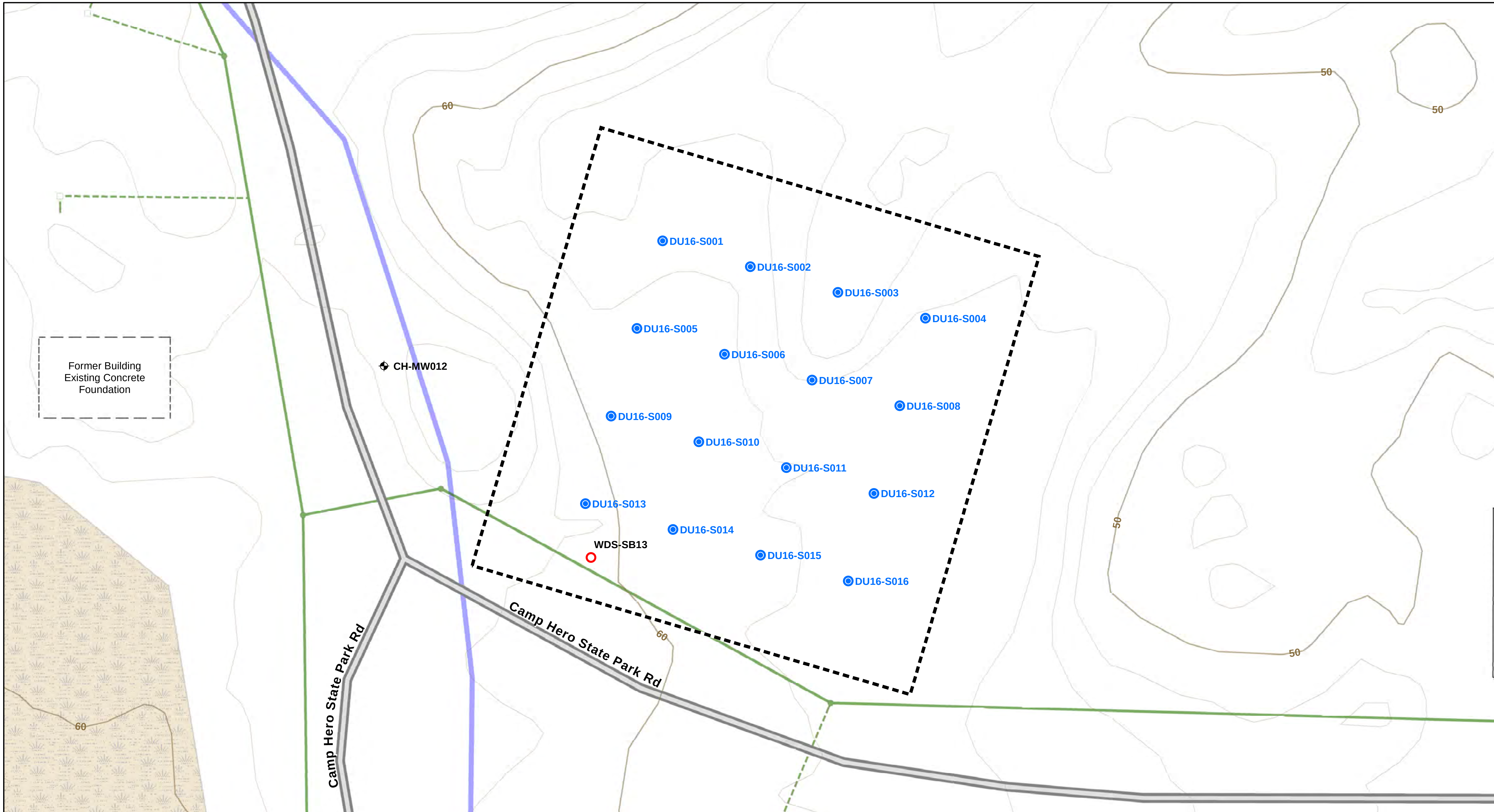
Proposed Phase III RI Sampling Locations
DU15, H6 Debris Area
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-17**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_17_DU15_H6_Debris_Area.mxd



Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Subsurface Soil Sample Location
- Existing Groundwater Monitoring Well
- Subsurface Soil - Exceedance
- Decision Unit
- Fence

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Manhole
- Box (cleanout or other)

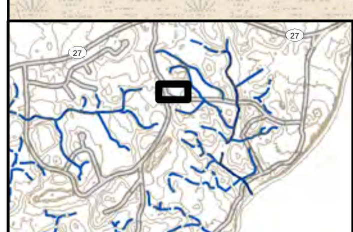
Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

DEC Wetlands

- Class 1
- Surface Water Divide



MAP LOCATION

0 15 30 Feet

1 inch = 30 feet

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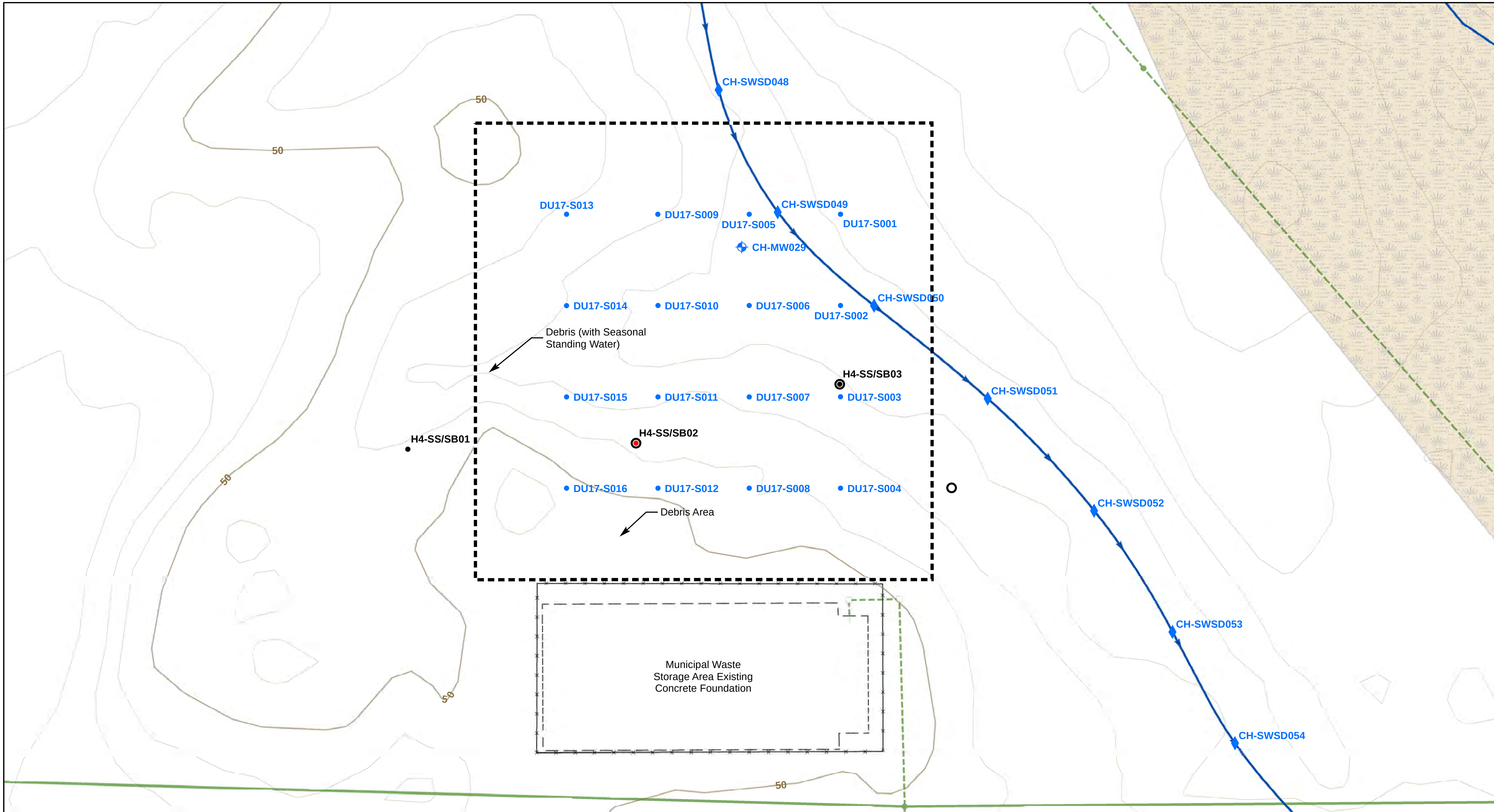
Proposed Phase III RI Sampling Locations
DU16, WDS Manhole Area 2

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-18**



MAP LOCATION

Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Proposed Surface Water and Sediment Sampling Location
- Proposed Groundwater Monitoring Well
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - No Exceedance
- Decision Unit
- Fence

Former Sanitary Sewer System Features

- Primary Sanitary Sewer Line
- Secondary WDS Line
- Manhole
- Box (cleanout or other)

Topographic Contours

- 10 ft
- 2 ft

Camp Hero Natural Features

DEC Wetlands

- Class 1
- Intermittent Drainage with Revetment

0 15 30 Feet

1 inch = 30 feet

N S E W

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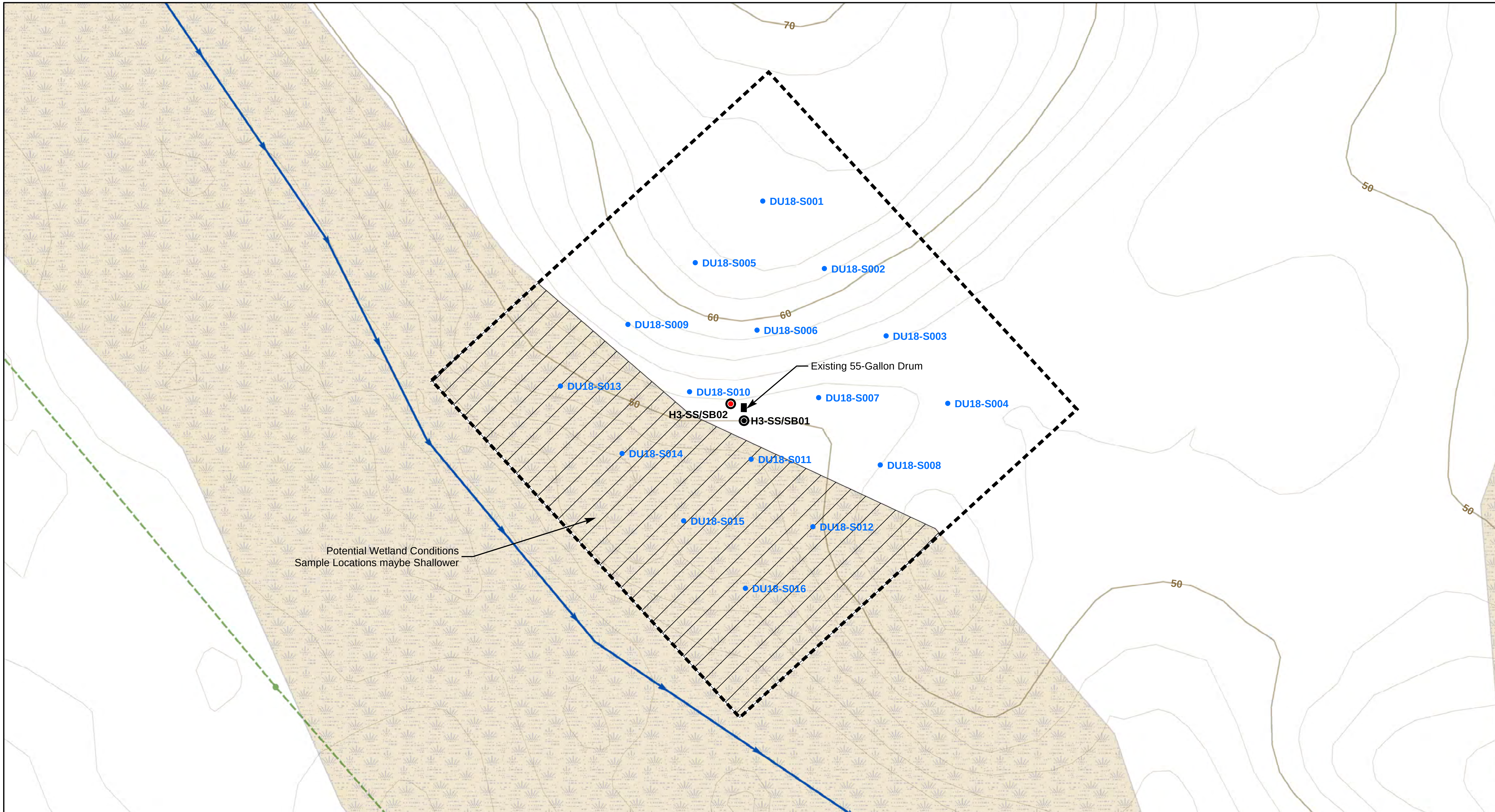
Proposed Phase III RI Sampling Locations
DU17, H4 Debris Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-19**

4/18/2017 \\USCHL1FP001\Data\Projects\Govt\Projects\USACE\Camp_Hero\GIS\Projects\Phase_III_RI\MXD\Fig_17_19_DU17_H4_Debris_Area.mxd



Camp Hero Built Features

- Proposed Surface Soil Sample Location
- Surface Soil - No Exceedance
- Surface Soil - Exceedance
- Subsurface Soil - No Exceedance
- Decision Unit

Former Sanitary Sewer System Features

- Secondary WDS Line
- Manhole

Topographic Contours

- 10 ft
- 2 ft
- Limited Accessibility

Camp Hero Natural Features

DEC Wetlands

- Class 1
- Intermittent Drainage with Revetment

N W E S

0 15 30 Feet

1 inch = 30 feet

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Proposed Phase III RI Sampling Locations
DU18, H3 Drum Storage Area

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	April 2017	**Figure 17-20**

Appendix B

Tables

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Table 10-1
Potential Human Health Exposure Pathways and Receptors - Current Scenarios
Camp Hero Remedial Investigation
Montauk, New York

Source	Source Medium	Release Mechanism	Exposure Medium	Exposure Route	On-Site Outdoor Maintenance Worker (Adult) [1]	On-Site Park Employee (Adult) [1]	On-Site Indoor Worker (Adult) [2]	On-Site Recreational User (Child/Adult) [3]	On-Site Trespasser (Youth) [4]
					Human Receptors - Current Scenarios				
Camp Hero AOCs	Surface Soil		Surface Soil (0 to 1 ft)	Ingestion	●	●		●	●
				Dermal	●	●		●	●
		Emission of Particulates and Vapors	Air (Dust & Vapors)	Inhalation	●	●		●	●
	Subsurface Soil (Infiltration/ Percolation from Surface Soil)		Suburface Soil (1 to 10 ft)	Ingestion					
				Dermal					
		Emission of Particulates	Air (Dust)	Inhalation					
		Emission of Vapors	Air (VOCs)	Inhalation					
		Migration of Vapors to Indoor Air	Indoor Air (VOCs)	Inhalation			Q		
		Leaching	Groundwater [5]	Ingestion					
				Dermal					
				Inhalation of VOCs in Shower Air					
				Inhalation of VOCs in Trench					
			Migration of Vapors to Indoor Air (from Groundwater)	Inhalation			●		
	Surface Soil	Erosion/ Runoff	Surface Water [6] (also from Groundwater)	Ingestion					
				Dermal	●	●		●	●
			Sediment [6]	Ingestion	●	●		●	●
				Dermal	●	●		●	●

Notes
● = Potentially complete exposure pathway to be evaluated.
Empty block = Incomplete exposure pathway.
Q = Pathway will be qualitatively evaluated.

1. Park employee (e.g., park police or naturalist) spends 225 days per year traveling to the DUs to check abandoned buildings, fences, or environmental study areas. The outdoor worker spends 40 days/year traveling to various DUs to repair park equipment or perform grounds maintenance. A fraction of exposure will be used to account for time spent at each DU for each worker.
2. Indoor worker is used to address the vapor intrusion exposure pathway only. Scenario will be evaluated where volatiles are present in the subsurface (within 100 feet horizontally and vertically of source area).
3. Recreational user is an adult and child (0 to 6 years) receptor that visits the Camp Hero park for 176 days/year (12 weeks during the winter for 2 days/week and 38 weeks during the rest of the year for 4 days/week). They spend their time walking on trails, picnicking, camping, wading in stream beds, etc. A fraction of exposure is used to account for time spent at each DU from the 176 days/year.
4. Trespasser is a youth (ages 6 through 16 years) that spends 88 days/year in the park climbing fences into restricted areas of a DU where current access is restricted. The trespasser is used to evaluate current land use exposure to soil, surface water and sediment instead of the recreational user at AOCs that have restricted (fenced) areas.
5. Groundwater lies in shallow perched zones and is not suitable for potable water use. If volatiles are identified as groundwater COPCs, then inhalation of vapors in indoor air (vapor intrusion) exposure pathway is addressed for the indoor worker.
6. Streams are intermittent so wading scenario is evaluated for all receptors (no full immersion swimming). Incidental ingestion of sediment is evaluated, assuming hand-to-mouth contact.

Table 10-2
Potential Human Health Exposure Pathways and Receptors - Future Scenarios
Camp Hero Remedial Invetigation
Montauk, New York

Source	Source Medium	Release Mechanism	Exposure Medium	Exposure Route	Human Receptors - Future Scenarios: On-Site Outdoor Maintenance Worker (Adult) (1)	On-Site Park Employee (Adult) (1)	On-Site Indoor Worker (Adult) (2)	On-Site Recreational User (Child/Adult) (3)	On-Site Construction Worker (Adult) (5)	On-Site Resident (Child/Adult) (6)	Off-Site Resident (Child/Adult) (7)
Camp Hero AOCs	Surface Soil		Surface Soil (0 to 1 ft)	Ingestion	●	●		●	●	X	
				Dermal	●	●		●	●	X	
	Surface Soil	Emission of Particulates and Vapors	Air (Dust & Vapors)	Inhalation	●	●		●	●	X	
	Surface Soil → Infiltration/ Percolation → Subsurface Soil		Suburface Soil (1 to 10 ft)	Ingestion					● (5)	● (5)	
				Dermal					● (5)	● (5)	
	Subsurface Soil	Emission of Particulates	Air (Dust)	Inhalation					● (5)	● (5)	
	Subsurface Soil	Emission of Vapors	Air (VOCs)	Inhalation					● (5)	● (5)	
	Subsurface Soil	Migration of Vapors to Indoor Air	Indoor Air (VOCs)	Inhalation			Q				
	Subsurface Soil	Leaching	Groundwater (6, 7)	Ingestion					●	X	o
				Dermal					●	X	o
				Inhalation of VOCs in Shower Air						X	o
				Inhalation of VOCs in Trench					●		
	Groundwater		Migration of Vapors to Indoor Air	Inhalation			●			X	
	Surface Soil / Groundwater	Erosion/ Runoff	Surface Water (8)	Ingestion							
				Dermal	●	●		●	●	x	
	Surface Water		Sediment (8)	Ingestion	●	●		●	●	x	
				Dermal	●	●		●	●	x	

Notes
Empty block = Incomplete exposure pathway
● = Potentially complete exposure pathway to be evaluated.
X = Pathway will be quantified for informational purposes only to address potential unlimited use/unrestricted exposure (UU/UE).
o = Pathway will be quantified if groundwater contamination is migrating offsite.
Q = Pathway will be qualitatively evaluated.

1. Park employee (e.g., park police or naturalist) spends 225 days per year traveling to the DUs to check abandoned buildings, fences, or environmental study areas. The outdoor worker spends 40 days/year traveling to various DUs to repair park equipment or perform grounds maintenance. A fraction of exposure will be used to account for time spent at each DU for each worker.
2. Indoor worker is used to address the vapor intrusion exposure pathway only; Scenario will be evaluated where volatiles are present in the subsurface (within 100 feet horizontally and vertically of source area).
3. Recreational user is an adult and child (0 to 6 years) receptor that visits the Camp Hero park for 176 days/year (12 weeks during the winter for 2 days/week and 38 weeks during the rest of the year for 4 days/week). They spend their time walking on trails, picnicking, camping, wading in stream beds, etc. A fraction of exposure is used to account for time spent at each DU from the 176 days/year.
4. Trespasser is a youth (ages 6 through 16 years) that spends 88 days/year in the park climbing fences into restricted areas of a DU where current access is restricted. The trespasser is used to evaluate current land use exposure to soil, surface water and sediment instead of the recreational user at AOCs that have restricted (fenced) areas. However, the recreational user is used to evaluate future land use, assuming the fences are removed from the DU.
5. Future excavation activities may result in the subsurface soil being brought to the surface and "mixed" together. Therefore, a total soil data set (0 to 10 feet bgs) will be derived for surface soil and/or subsurface soil COPCs, assuming future land re-development occurs.
6. Residential use is calculated for informational purposes to account for possible UU/UE scenarios. There are currently no plans for future residential use (per Mr. Foley of the Long Island State Parks Region on April 3, 2017) so this exposure scenario is unlikely and highly conservative. Residential exposure to groundwater is evaluated if COPCs are identified; however, an evaluation of the perched groundwater indicates it is not suitable for potable use so this scenario is also unlikely and highly conservative. The vapor intrusion pathway will be addressed if volatiles are identified as groundwater COPCs.
7. Groundwater lies in shallow perched zones and is not suitable for potable water use; therefore, any evaluation of this water as drinking water is provided for informational purposes only to address potential UU/UE. If groundwater COPCs are detected in less than 10 feet bgs, then direct contact with groundwater is evaluated for the construction worker. If a volatile is identified as a groundwater COPC, then inhalation of vapors migrating from groundwater to trench air is evaluated. Offsite residential exposure to groundwater is only evaluated if offsite migration is identified. Given that perched groundwater is not potable, this evaluation is unlikely and highly conservative.
8. Streams are intermittent so wading scenario is evaluated for all receptors (no full immersion swimming). Incidental ingestion of sediment is evaluated, assuming hand-to-mouth contact.

Table 10-3
Potential Ecological Exposure Pathways and Receptors
Camp Hero Remedial Investigation
Montauk, New York

Source	Source Medium	Release Mechanism	Exposure Medium	Exposure Route	Ecological Receptors: Terrestrial Plants (1)	Terrestrial Invertebrates (1)	Aquatic Organisms (2)	Benthic Invertebrates (2)	Terrestrial Insectivorous Wildlife (3)	Terrestrial Herbivorous Wildlife (3)	Semi-Aquatic Insectivorous Wildlife (4)	Semi-Aquatic Herbivorous Wildlife (4)
Camp Hero AOCs	Surface Soil		Surface Soil (0 to 1 ft)	Ingestion/Bio-uptake					●	●		
				Direct Contact	●	●			● (10)	● (10)		
	Surface Soil	Emission of Particulates and Vapors	Air (Dust & Vapors) (5,6)	Inhalation								
	Surface Soil → Infiltration/ Percolation → Subsurface Soil		Subsurface Soil (1 to 10 ft) (7)	Ingestion								
				Direct Contact								
	Subsurface Soil	Emission of Particulates	Air (Dust) (5)	Inhalation								
	Subsurface Soil	Emission of Vapors	Air (VOCs) (6)	Inhalation								
	Subsurface Soil	Leaching	Groundwater (8)	Ingestion								
				Direct Contact								
	Surface Soil	Erosion/ Runoff	Surface Water (9) (also from Groundwater; exchange with Sediment)	Ingestion/Bio-uptake							(11)	(11)
				Direct Contact			●				● (10)	● (10)
			Sediment (9)	Ingestion/Bio-uptake							X	X
				Direct Contact				●			● (10)	● (10)

Notes
● = Potentially complete exposure pathway to be evaluated
Empty block = Incomplete exposure pathway

1. Soil invertebrates and plants are assumed to take up soil COPECs through the integument and root hairs respectively.
2. Aquatic and benthic organisms may be exposed to constituents in surface water and sediments and take up site-related chemicals by sorption across skin and gills and by ingestion of water or sediment, respectively.
3. Terrestrial wildlife ingest plant parts (i.e., leaves, seeds, roots) and soil invertebrates that may have taken up COPECs from the soil into their body tissues. Soil may also be incidentally ingested during feeding.
4. Semiaquatic wildlife may ingest contaminated benthic organisms and aquatic plants in aquatic sites. Sediment may also be incidentally ingested during feeding.
5. Inhalation of contaminated dust is expected to be insignificant because the site is well vegetated and dust generation is minimal.
6. VOCs may volatilize into soil air spaces from soil and migrate to the soil surface where they may be emitted to the atmosphere, but scientific data to estimate exposure of wildlife is lacking, so the pathway is not evaluated quantitatively. Exposure to VOCs by breathing contaminated air is expected to be insignificant compared to exposure by ingestion pathways.
7. Ecological receptors are not expected to come into contact with subsurface soils; therefore, this exposure pathway is considered incomplete. The majority of bird and mammal exposure comes from ingestion of food (plants and soil invertebrates). The majority of plant and invertebrate chemical exposure is from uptake in surface soil.
8. Ecological receptors are not expected to be exposed to groundwater; therefore, this exposure pathway is considered incomplete.
9. Streams are intermittent and unlikely to support a fish community or associated piscivores. Wildlife receptors may consume aquatic plants and/or invertebrates.
10. Dermal absorption of surface soil, sediment, or surface water contaminants is potentially complete for ecological receptors, but scientific data to estimate exposure of wildlife is lacking, so the pathway is not evaluated quantitatively. Exposure to COPECs by dermal absorption by wildlife is expected to be insignificant compared to exposure by ingestion pathways.
11. Wildlife receptors may drink surface water, but much of their water requirements are met through food ingestion. Drinking is considered an insignificant pathway compared to food intake, so the pathway is not evaluated quantitatively.

Table 10-4
Ecological Assessment and Measurement Endpoints
Camp Hero Remedial Investigation
Montauk, New York

Receptor of Concern	Exposure Pathway	Assessment Endpoint [1]	Testable Hypothesis	Measurement Endpoint	Data Available
Lower trophic level terrestrial species (e.g., earthworms and plants).	Uptake of chemicals in soil.	**AE 1**: Protection and maintenance (survival, growth, and reproduction) of plants and soil invertebrates.	H_0: The concentration of COPECs in surface soil does not exceed a level known to be toxic to plants or soil invertebrates.	Compare concentrations of COPECs in surface soil with soil benchmarks developed to protect growth and reproduction of plant and soil invertebrates.	Site-specific chemical data for surface soil from within DUs.
Terrestrial insectivorous birds (represented by the American robin).	Ingestion of chemicals in soil and accumulated in soil invertebrates.	**AE 2**: Protection and maintenance (survival, growth, and reproduction) of insectivorous birds.	H_0: The ingestion of bioaccumulative COPECs in soil invertebrates and surface soil does not exceed a level known to be toxic to birds.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative birds for each COPEC.	Site-specific chemical data for surface soil from within DUs.
Terrestrial herbivorous birds (represented by mourning dove).	Ingestion of chemicals accumulated in plants.	**AE 3**: Protection and maintenance (survival, growth, and reproduction) of herbivorous birds.	H_0: The ingestion of bioaccumulative COPECs in plants does not exceed a level known to be toxic to birds.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative birds for each COPEC.	Site-specific chemical data for surface soil from within DUs.
Terrestrial herbivorous mammals (represented by meadow vole).	Ingestion of chemicals in soil and accumulated in plants.	**AE 4**: Protection and maintenance (survival, growth, and reproduction) of herbivorous mammals.	H_0: The ingestion of bioaccumulative COPECs in plants and in surface soil does not exceed a level known to be toxic to mammals.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative mammals for each COPEC.	Site-specific chemical data for surface soil from within DUs.
Terrestrial insectivorous mammals (represented by masked shrew).	Ingestion of chemicals in soil and accumulated in soil invertebrates.	**AE 5**: Protection and maintenance (survival, growth, and reproduction) of insectivorous mammals.	H_0: The ingestion of bioaccumulative COPECs in surface soil and soil invertebrates does not exceed a level known to be toxic to mammals.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative mammals for each COPEC.	Site-specific chemical data for surface soil from within DUs.
Sediment-dwelling organisms (e.g., benthic invertebrates and amphibian larvae).	Uptake of chemicals from sediment.	**AE 6**: Protection and maintenance of benthic organisms.	H_0: The concentration of COPECs in the sediment does not exceed a level known to be toxic to benthic organisms.	Compare concentrations of COPECs in sediment to sediment threshold effect levels.	Site-specific chemical data for sediment from within or downstream from DUs.
Aquatic organisms (e.g., aquatic invertebrates and amphibian larvae)	Uptake of chemicals from surface water.	**AE 7**: Protection and maintenance of aquatic organisms.	H_0: The concentration of COPECs in surface water does not exceed a level known to be toxic to aquatic organisms.	Compare concentrations of COPECs in surface water to surface water quality criteria for chronic exposure.	Site-specific chemical data for surface water from within or downstream from DUs.
Semiaquatic herbivorous mammals (represented by the meadow vole).	Ingestion of chemicals accumulated in aquatic plants from sediment.	**AE 8**: Protection and maintenance (survival, growth, and reproduction) of semiaquatic herbivorous mammals.	H_0: The ingestion of bioaccumulative COPECs in aquatic plants does not exceed a level known to be toxic to mammals.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative mammals for each COPEC.	Site-specific chemical data for sediment from within or downstream of DUs.
Semiaquatic insectivorous bird (represented by the American robin).	Ingestion of chemicals in sediment and accumulated in benthic invertebrates.	**AE 8**: Protection and maintenance (survival, growth, and reproduction) of semiaquatic insectivorous birds.	H_0: The ingestion of bioaccumulative COPECs in sediment and sediment invertebrates does not exceed a level known to be toxic to mammals.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative birds for each COPEC.	Site-specific chemical data for surface water from within or downstream of DUs.
Semiaquatic insectivorous mammals (represented by masked shrew).	Ingestion of chemicals in sediment and accumulated in benthic invertebrates.	**AE 10**: Protection and maintenance (survival, growth, and reproduction) of wetland insectivorous mammals.	H_0: The ingestion of bioaccumulative COPECs in sediment and sediment invertebrates does not exceed a level known to be toxic to mammals.	Comparison of literature-derived chronic NOAEL-based benchmarks to estimated chronic daily intake for representative mammals for each COPEC.	Site-specific chemical data for sediment from within or downstream from DUs.

Notes:

1. Assessment endpoints identified for evaluation are based on the parameters used to derive toxicity benchmarks (see Measurement Endpoint column) and are not intended to imply measurement of these parameters in the field.
COPEC - Chemical of Potential Ecological Concern.
DU - Decision Unit.
H_0 = Null Hypothesis.
NOAEL - No Observed Adverse Effect Level.

Table 10-5
Decision Unit Selection and Phase III Sampling Needs
Camp Hero Remedial Investigation
Montauk, New York

Decision Unit ID	Decision Unit Name	Included Former AOCs	SS Analytes Above Preliminary Screening Values and BTVs	SB Analytes Above Preliminary Screening Values and BTVs	Phase III Sampling Needs based on Preliminary Screening			Phase III Sampling Needs to Support Risk Assessment, CSM, and FS							Notes
					VOCs	SVOCs	Metals	VOCs	SVOCs	PCBs	Metals	GeoChem (pH/ORP)	GeoTech	MNA	
DU01	Building 203 Area	Building 203	N/A - No Preliminary Screening of Surface Soil Samples; Surface Soil Sampling completed along unbiased grid for calculation of EPCs within two Sampling Units during Phase II	Aluminum, Arsenic, Chromium, Chromium III, Chromium VI, Cobalt, Iron, Magnesium, Manganese, Thallium, Vanadium,1-Methylnaphthalene, 2-Methylnaphthalene, Benzo(a)pyrene, Biphenyl, 1,1'-, Naphthalene, Ethylbenzene, Total Xylenes, Total BaP PAHs	SB	SB	SB	GW	GW	-	GW	SB, GW	SB	GW	Unbiased SS Sampling Completed in Phase II. Drainage Channel downgradient of this DU. Sitewide network wells in the vicinity of these former AOCs will also be analyzed for petroleum-related compounds.
DU02	H2 Drum Area	Drum Location (H-2)	Lead, Manganese, Zinc	None	-	-	SS	-	SW/SD	-	SW/SD	SS, SW/SD	-	-	Drainage Channel downgradient of this DU.
DU03	H1 Drum Area	Drum Location (H-1)	Cadmium, Benzo(a)pyrene, Total BaP PAHs Calculated	Benzo(a)pyrene, Total BaP PAHs	-	SS, SB	SS	-	SW/SD	-	SW/SD	SS, SW/SD	-	-	Drainage Channel within DU.
DU04	H18 Drum Area	Drum Location (H-18)	Thallium	None	-	-	SS	-	-	-	-	SS	-	-	
DU05	WDS Cesspool Area	WDS SB25 - SB27 Cesspools	No Surface Soil Samples	Arsenic, Iron	-	-	SS, SB	-	SW/SD	-	SW/SD	SB, SW/SD	-	-	Drainage Channel within DU.
DU06	Former Power Plant Area	Former Power Plant (H-11), Former Sewage Ejector Station (H-12), WDS SB23 - SB24 Tile Field	Lead	Arsenic, Chromium, Vanadium, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	-	SS, SB	SS, SB	-	SW/SD	-	SW/SD	SS, SB, SW/SD	-	-	Coal present at this DU.
DU07	H-19, H-20 AST/Drum Area	Former AST (H-19), Drum Location (H-20), Possible Boiler (H-9)	Cadmium, Lead, Manganese	Iron, Benzo(a)pyrene, Total BaP PAHs	-	SS, SB	SS, SB	-	SW/SD	-	SW/SD	SS, SB, SW/SD	-	-	Drainage Channel within DU.
DU08	WDS Chlorine Contact Chamber Area	WDS SB01 - SB03 Chlorine Contact Chamber	Lead, Manganese, Benzo(a)pyrene, Benzo(b)fluoranthene	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	-	SS, SB	SS	-	SW/SD	-	SW/SD	SS, SW/SD	-	-	Drainage Channel within DU.
DU09	H-15 Coal Storage Area	Former Coal Storage (H-15)	Antimony, Cobalt, Manganese, Thallium	No Subsurface Soil Samples from 1 - 10 ft bgs	-	-	SS	-	-	-	SS	SS	-	-	
DU10	H-5 Drum/Debris Area	Drum Location with Construction Debris (H-5)	Antimony, Arsenic, Beryllium, Cadmium, Cobalt, Lead, Selenium, Silver, Zinc	None	-	-	SS	-	SW/SD	-	SW/SD	SS, SW/SD	-	-	Intermittent drainage channel within DU.
DU11	H16/WDS Septic/former Building 34 Area	Former Building 34, Former Sewage Treatment Area (H-16), Motor Pool - Drain (SB02) and Cesspool (SB03)	Arsenic, Cadmium, Lead, Manganese, Thallium, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Dibenzofuran, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, Pyrene, Total BaP PAHs, Total HMW PAHs, Total LMW PAHs	None	-	SS	SS	-	SW/SD	-	SW/SD	SS, SW/SD	-	-	Drainage Channel within DU.
DU12	WDS Manhole Area 1	WDS SB08 - SB09 Box and Manhole	No Surface Soil Samples	Benzo(a)pyrene, Total BaP PAHs	-	SS, SB	-	-	SW/SD	-	SW/SD	SW/SD	-	-	Drainage channel within DU.
DU13	H-14 Coal Storage Area	Former Coal Storage (H-14)	Arsenic, Cobalt, Manganese, Thallium	None	-	-	SS	-	-	-	-	SS	-	-	
DU14	WDS Septic Tank Area	WDS SB06 - SB07 Suspected Septic Tank	No Surface Soil Samples	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Dibenzofuran, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	-	SS, SB	-	-	SW/SD	-	SW/SD	SW/SD	-	-	Drainage channel within DU.
DU15	H-6 Debris Area	Construction Debris Area (H-6)	Lead	No Subsurface Soil Samples	-	-	SS	-	SW/SD	SS, SB, GW, SW/SD	GW, SW/SD	SS, GW, SW/SD	-	GW	PCBs were added to sampling parameters based on prior detection in grab water sample. Sitewide network wells in the vicinity of this DU and the surface water and sediment downgradient of this DU will be sampled for PCBs in addition to the sitewide parameters.
DU16	WDS Manhole Area 2	WDS SB13	No Surface Soil Samples	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	-	SS, SB	-	-	-	-	-	-	-	-	
DU17	H-4 Debris Area	Construction Debris Area (H-4)	Lead	None	-	-	SS	-	SW/SD	-	SW/SD	SS, SW/SD	-	-	
DU18	H-3 Drum Area	Drum Site (H-3)	Cadmium, Zinc	None	-	-	SS	-	-	-	-	SS	-	-	Drainage Channel downgradient of this DU.
Site-Wide Groundwater	N/A	N/A	N/A	N/A	-	-	-	-	GW		GW	GW	-	GW	Sitewide well network to assess regional groundwater impacts.
Groundwater Near AST35/FPH, STB, MP	N/A	Former AST-35, Fuel Pump House, Suspected Tank B	N/A	N/A	-	-	-	GW	GW		GW	GW	-	GW	Sitewide network wells in the vicinity of these former AOCs will also be analyzed for petroleum-related compounds in addition to the sitewide parameters based on prior detection in grab water samples and field indicators. Soil samples will be collected from the well installation borings to support the CSM.

Notes:
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
MNA - Monitored natural attenuation parameters to support the FS

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen PID	Field Sample ID	Target Parameters VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	Rationale/Comments
DU01														
DU01-S001	DP	Subsurface Soil	10'	1-10'	X	DU01-S001-01-10	X	X		X	X	X		To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU01-S002	DP	Subsurface Soil	35'	1-10'	X	DU01-S002-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S002	DP	Subsurface Soil	35'	TBD	X	DU01-S002-__-__							X	To collect subsurface physical characteristic data to evaluate potential LNAPL response actions in the FS. Depth interval TBD in the field.
DU01-S003	DP	Subsurface Soil	10'	1-10'	X	DU01-S003-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S004	DP	Subsurface Soil	10'	1-10'	X	DU01-S004-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S005	DP	Subsurface Soil	10'	1-10'	X	DU01-S005-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S006	DP	Subsurface Soil	35'	1-10'	X	DU01-S006-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S006	DP	Subsurface Soil	35'	TBD	X	DU01-S006-__-__							X	To collect subsurface physical characteristic data to evaluate potential LNAPL response actions in the FS. Depth interval TBD in the field.
DU01-S007	DP	Subsurface Soil	35'	1-10'	X	DU01-S007-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S007	DP	Subsurface Soil	35'	TBD	X	DU01-S007-__-__							X	To collect subsurface physical characteristic data to evaluate potential LNAPL response actions in the FS. Depth interval TBD in the field.
DU01-S008	DP	Subsurface Soil	35'	1-10'	X	DU01-S008-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S009	DP	Subsurface Soil	10'	1-10'	X	DU01-S009-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S010	DP	Subsurface Soil	10'	1-10'	X	DU01-S010-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S011	DP	Subsurface Soil	10'	1-10'	X	DU01-S011-01-10	X	X		X	X	X		To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU01-S012	DP	Subsurface Soil	10'	1-10'	X	DU01-S012-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S013	DP	Subsurface Soil	35'	1-10'	X	DU01-S013-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S014	DP	Subsurface Soil	35'	1-10'	X	DU01-S014-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S015	DP	Subsurface Soil	10'	1-10'	X	DU01-S015-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU01-S016	DP	Subsurface Soil	10'	1-10'	X	DU01-S016-01-10	X	X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen	Field Sample ID	Target Parameters							Rationale/Comments
					PID		VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	
DU02														
DU02-S001	HA	Surface Soil	N/A	0-1'		DU02-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU02-S002	HA	Surface Soil	N/A	0-1'		DU02-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S003	HA	Surface Soil	N/A	0-1'		DU02-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S004	HA	Surface Soil	N/A	0-1'		DU02-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S005	HA	Surface Soil	N/A	0-1'		DU02-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S006	HA	Surface Soil	N/A	0-1'		DU02-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S007	HA	Surface Soil	N/A	0-1'		DU02-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S008	HA	Surface Soil	N/A	0-1'		DU02-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S009	HA	Surface Soil	N/A	0-1'		DU02-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S010	HA	Surface Soil	N/A	0-1'		DU02-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S011	HA	Surface Soil	N/A	0-1'		DU02-S011-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S012	HA	Surface Soil	N/A	0-1'		DU02-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S013	HA	Surface Soil	N/A	0-1'		DU02-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S014	HA	Surface Soil	N/A	0-1'		DU02-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S015	HA	Surface Soil	N/A	0-1'		DU02-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU02-S016	HA	Surface Soil	N/A	0-1'		DU02-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03														
DU03-S001	DP	Subsurface Soil	10'	1-10'	X	DU03-S001-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S001	DP	Surface Soil	10'	0-1'	X	DU03-S001-00-01		X		X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU03-S002	DP	Subsurface Soil	10'	1-10'	X	DU03-S002-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S002	DP	Surface Soil	10'	0-1'	X	DU03-S002-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S003	DP	Subsurface Soil	10'	1-10'	X	DU03-S003-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S003	DP	Surface Soil	10'	0-1'	X	DU03-S003-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S004	DP	Subsurface Soil	10'	1-10'	X	DU03-S004-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S004	DP	Surface Soil	10'	0-1'	X	DU03-S004-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S005	DP	Subsurface Soil	10'	1-10'	X	DU03-S005-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S005	DP	Surface Soil	10'	0-1'	X	DU03-S005-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S006	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S006-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S006	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S006-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S007	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S007-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S007	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S007-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S008	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S008-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S008	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S008-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interva
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list`
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen	Field Sample ID	Target Parameters							Rationale/Comments
					PID		VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	
DU03-S009	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S009-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S009	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S009-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S010	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S010-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S010	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S010-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S011	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S011-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S011	DP or HA (TBD)	Surface Soil	10'	0-1'	X	DU03-S011-00-01		X		X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU03-S012	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S012-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S012	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S012-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S013	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S013-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S013	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S013-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S014	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S014-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S014	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S014-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S015	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S015-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S015	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S015-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU03-S016	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S016-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU03-S016	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S016-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04														
DU04-S001	HA	Surface Soil	N/A	0-1'		DU04-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU04-S002	HA	Surface Soil	N/A	0-1'		DU04-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S003	HA	Surface Soil	N/A	0-1'		DU04-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S004	HA	Surface Soil	N/A	0-1'		DU04-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S005	HA	Surface Soil	N/A	0-1'		DU04-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S006	HA	Surface Soil	N/A	0-1'		DU04-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S007	HA	Surface Soil	N/A	0-1'		DU04-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S008	HA	Surface Soil	N/A	0-1'		DU04-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S009	HA	Surface Soil	N/A	0-1'		DU04-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S010	HA	Surface Soil	N/A	0-1'		DU04-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S011	HA	Surface Soil	N/A	0-1'		DU04-S011-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU04-S012	HA	Surface Soil	N/A	0-1'		DU04-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S013	HA	Surface Soil	N/A	0-1'		DU04-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S014	HA	Surface Soil	N/A	0-1'		DU04-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S015	HA	Surface Soil	N/A	0-1'		DU04-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU04-S016	HA	Surface Soil	N/A	0-1'		DU04-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

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SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen	Field Sample ID	Target Parameters							Rationale/Comments
					PID		VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	
DU05														
DU05-S001	DP	Subsurface Soil	10'	1-10'		DU05-S001-01-10				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU05-S001	DP	Surface Soil	10'	0-1'		DU05-S001-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S002	DP	Subsurface Soil	10'	1-10'		DU05-S002-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S002	DP	Surface Soil	10'	0-1'		DU05-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S003	DP	Subsurface Soil	10'	1-10'		DU05-S003-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S003	DP	Surface Soil	10'	0-1'		DU05-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S004	DP	Subsurface Soil	10'	1-10'		DU05-S004-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S004	DP	Surface Soil	10'	0-1'		DU05-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S005	DP	Subsurface Soil	10'	1-10'		DU05-S005-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S005	DP	Surface Soil	10'	0-1'		DU05-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S006	DP	Subsurface Soil	10'	1-10'		DU05-S006-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S006	DP	Surface Soil	10'	0-1'		DU05-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S007	DP	Subsurface Soil	10'	1-10'		DU05-S007-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S007	DP	Surface Soil	10'	0-1'		DU05-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S008	DP	Subsurface Soil	10'	1-10'		DU05-S008-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S008	DP	Surface Soil	10'	0-1'		DU05-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S009	DP	Subsurface Soil	10'	1-10'		DU05-S009-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S009	DP	Surface Soil	10'	0-1'		DU05-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S010	DP	Subsurface Soil	10'	1-10'		DU05-S010-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S010	DP	Surface Soil	10'	0-1'		DU05-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S011	DP	Subsurface Soil	10'	1-10'		DU05-S011-01-10				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU05-S011	DP	Surface Soil	10'	0-1'		DU05-S011-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S012	DP	Subsurface Soil	10'	1-10'		DU05-S012-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S012	DP	Surface Soil	10'	0-1'		DU05-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S013	DP	Subsurface Soil	10'	1-10'		DU05-S013-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S013	DP	Surface Soil	10'	0-1'		DU05-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S014	DP	Subsurface Soil	10'	1-10'		DU05-S014-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S014	DP	Surface Soil	10'	0-1'		DU05-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S015	DP	Subsurface Soil	10'	1-10'		DU05-S015-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S015	DP	Surface Soil	10'	0-1'		DU05-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S016	DP	Subsurface Soil	10'	1-10'		DU05-S016-01-10				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU05-S016	DP	Surface Soil	10'	0-1'		DU05-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06														
DU06-S001	DP	Subsurface Soil	10'	1-10'	X	DU06-S001-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S001	DP	Surface Soil	10'	0-1'	X	DU06-S001-00-01		X		X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU06-S002	DP	Subsurface Soil	10'	1-10'	X	DU06-S002-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S002	DP	Surface Soil	10'	0-1'	X	DU06-S002-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
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VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
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Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen PID	Field Sample ID	Target Parameters VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	Rationale/Comments
DU06-S003	DP	Subsurface Soil	10'	1-10'	X	DU06-S003-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S003	DP	Surface Soil	10'	0-1'	X	DU06-S003-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S004	DP	Subsurface Soil	10'	1-10'	X	DU06-S004-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S004	DP	Surface Soil	10'	0-1'	X	DU06-S004-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S005	DP	Subsurface Soil	10'	1-10'	X	DU06-S005-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S005	DP	Surface Soil	10'	0-1'	X	DU06-S005-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S006	DP	Subsurface Soil	10'	1-10'	X	DU06-S006-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S006	DP	Surface Soil	10'	0-1'	X	DU06-S006-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S007	DP	Subsurface Soil	10'	1-10'	X	DU06-S007-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S007	DP	Surface Soil	10'	0-1'	X	DU06-S007-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S008	DP	Subsurface Soil	10'	1-10'	X	DU06-S008-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S008	DP	Surface Soil	10'	0-1'	X	DU06-S008-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S009	DP	Subsurface Soil	10'	1-10'	X	DU06-S009-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S009	DP	Surface Soil	10'	0-1'	X	DU06-S009-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S010	DP	Subsurface Soil	10'	1-10'	X	DU06-S010-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S010	DP	Surface Soil	10'	0-1'	X	DU06-S010-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S011	DP	Subsurface Soil	10'	1-10'	X	DU06-S011-01-10		X		X	X	X		To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU06-S011	DP	Surface Soil	10'	0-1'	X	DU06-S011-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S012	DP	Subsurface Soil	10'	1-10'	X	DU06-S012-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S012	DP	Surface Soil	10'	0-1'	X	DU06-S012-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S013	DP	Subsurface Soil	10'	1-10'	X	DU06-S013-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S013	DP	Surface Soil	10'	0-1'	X	DU06-S013-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S014	DP	Subsurface Soil	10'	1-10'	X	DU06-S014-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S014	DP	Surface Soil	10'	0-1'	X	DU06-S014-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S015	DP	Subsurface Soil	10'	1-10'	X	DU06-S015-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S015	DP	Surface Soil	10'	0-1'	X	DU06-S015-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU06-S016	DP	Subsurface Soil	10'	1-10'	X	DU06-S016-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU06-S016	DP	Surface Soil	10'	0-1'	X	DU06-S016-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07														
DU07-S001	DP	Subsurface Soil	10'	1-10'	X	DU07-S001-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S001	DP	Surface Soil	10'	0-1'	X	DU07-S001-00-01		X		X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU07-S002	DP	Subsurface Soil	10'	1-10'	X	DU07-S002-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S002	DP	Surface Soil	10'	0-1'	X	DU07-S002-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S003	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU07-S003-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S003	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU07-S003-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S004	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU07-S004-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S004	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU07-S004-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen PID	Field Sample ID	Target Parameters VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	Rationale/Comments
DU07-S005	DP	Subsurface Soil	10'	1-10'	X	DU07-S005-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S005	DP	Surface Soil	10'	0-1'	X	DU07-S005-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S006	DP	Subsurface Soil	10'	1-10'	X	DU07-S006-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S006	DP	Surface Soil	10'	0-1'	X	DU07-S006-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S007	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU03-S015-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S007	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU03-S015-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S008	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU07-S008-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S008	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU07-S008-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S009	DP	Subsurface Soil	10'	1-10'	X	DU07-S009-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S009	DP	Surface Soil	10'	0-1'	X	DU07-S009-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S010	DP	Subsurface Soil	10'	1-10'	X	DU07-S010-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S010	DP	Surface Soil	10'	0-1'	X	DU07-S010-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S011	DP	Subsurface Soil	10'	1-10'	X	DU07-S011-01-10		X		X	X	X		To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU07-S011	DP	Surface Soil	10'	0-1'	X	DU07-S011-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S012	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU07-S012-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S012	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU07-S012-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S013	DP	Subsurface Soil	10'	1-10'	X	DU07-S013-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S013	DP	Surface Soil	10'	0-1'	X	DU07-S013-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S014	DP	Subsurface Soil	10'	1-10'	X	DU07-S014-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S014	DP	Surface Soil	10'	0-1'	X	DU07-S014-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S015	DP	Subsurface Soil	10'	1-10'	X	DU07-S015-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S015	DP	Surface Soil	10'	0-1'	X	DU07-S015-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU07-S016	DP	Subsurface Soil	10'	1-10'	X	DU07-S016-01-10		X		X				To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU07-S016	DP	Surface Soil	10'	0-1'	X	DU07-S016-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen PID	Field Sample ID	Target Parameters VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	Rationale/Comments
DU08														
DU08-S001	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S001-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S001	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S001-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S002	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S002-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S002	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S002-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S003	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S003-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S003	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S003-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S004	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S004-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S004	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S004-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S005	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S005-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S005	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S005-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S006	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S006-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S006	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S006-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S007	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S007-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S007	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S007-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S008	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S008-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S008	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S008-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S009	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S009-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S009	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S009-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S010	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S010-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S010	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S010-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S011	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S011-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S011	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S011-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S012	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU08-S012-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S012	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU08-S012-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S013	DP	Subsurface Soil	10'	1-10'	X	DU08-S013-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S013	DP	Surface Soil	10'	0-1'	X	DU08-S013-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S014	DP	Subsurface Soil	10'	1-10'	X	DU08-S014-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S014	DP	Surface Soil	10'	0-1'	X	DU08-S014-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S015	DP	Subsurface Soil	10'	1-10'	X	DU08-S015-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S015	DP	Surface Soil	10'	0-1'	X	DU08-S015-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU08-S016	DP	Subsurface Soil	10'	1-10'	X	DU08-S016-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU08-S016	DP	Surface Soil	10'	0-1'	X	DU08-S016-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen PID	Field Sample ID	Target Parameters VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	Rationale/Comments
DU09														
DU09-S001	HA	Surface Soil	N/A	0-1'		DU09-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU09-S002	HA	Surface Soil	N/A	0-1'		DU09-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S003	HA	Surface Soil	N/A	0-1'		DU09-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S004	HA	Surface Soil	N/A	0-1'		DU09-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S005	HA	Surface Soil	N/A	0-1'		DU09-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S006	HA	Surface Soil	N/A	0-1'		DU09-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S007	HA	Surface Soil	N/A	0-1'		DU09-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S008	HA	Surface Soil	N/A	0-1'		DU09-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S009	HA	Surface Soil	N/A	0-1'		DU09-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S010	HA	Surface Soil	N/A	0-1'		DU09-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S011	HA	Surface Soil	N/A	0-1'		DU09-S011-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU09-S012	HA	Surface Soil	N/A	0-1'		DU09-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S013	HA	Surface Soil	N/A	0-1'		DU09-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S014	HA	Surface Soil	N/A	0-1'		DU09-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S015	HA	Surface Soil	N/A	0-1'		DU09-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU09-S016	HA	Surface Soil	N/A	0-1'		DU09-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10														
DU10-S001	HA	Surface Soil	N/A	0-1'		DU10-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU10-S002	HA	Surface Soil	N/A	0-1'		DU10-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S003	HA	Surface Soil	N/A	0-1'		DU10-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S004	HA	Surface Soil	N/A	0-1'		DU10-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S005	HA	Surface Soil	N/A	0-1'		DU10-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S006	HA	Surface Soil	N/A	0-1'		DU10-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S007	HA	Surface Soil	N/A	0-1'		DU10-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S008	HA	Surface Soil	N/A	0-1'		DU10-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S009	HA	Surface Soil	N/A	0-1'		DU10-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S010	HA	Surface Soil	N/A	0-1'		DU10-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S011	HA	Surface Soil	N/A	0-1'		DU10-S011-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU10-S012	HA	Surface Soil	N/A	0-1'		DU10-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S013	HA	Surface Soil	N/A	0-1'		DU10-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S014	HA	Surface Soil	N/A	0-1'		DU10-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S015	HA	Surface Soil	N/A	0-1'		DU10-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU10-S016	HA	Surface Soil	N/A	0-1'		DU10-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

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DU11														
DU11-S001	HA	Surface Soil	N/A	0-1'		DU11-S001-00-01		X		X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU11-S002	HA	Surface Soil	N/A	0-1'		DU11-S002-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S003	HA	Surface Soil	N/A	0-1'		DU11-S003-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S004	HA	Surface Soil	N/A	0-1'		DU11-S004-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S005	HA	Surface Soil	N/A	0-1'		DU11-S005-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S006	HA	Surface Soil	N/A	0-1'		DU11-S006-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S007	HA	Surface Soil	N/A	0-1'		DU11-S007-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S008	HA	Surface Soil	N/A	0-1'		DU11-S008-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S009	HA	Surface Soil	N/A	0-1'		DU11-S009-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S010	HA	Surface Soil	N/A	0-1'		DU11-S010-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S011	HA	Surface Soil	N/A	0-1'		DU11-S011-00-01		X		X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU11-S012	HA	Surface Soil	N/A	0-1'		DU11-S012-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S013	HA	Surface Soil	N/A	0-1'		DU11-S013-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S014	HA	Surface Soil	N/A	0-1'		DU11-S014-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S015	HA	Surface Soil	N/A	0-1'		DU11-S015-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU11-S016	HA	Surface Soil	N/A	0-1'		DU11-S016-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12														
DU12-S001	DP	Subsurface Soil	10'	1-10'	X	DU12-S001-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S001	DP	Surface Soil	10'	0-1'	X	DU12-S001-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S002	DP	Subsurface Soil	10'	1-10'	X	DU12-S002-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S002	DP	Surface Soil	10'	0-1'	X	DU12-S002-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S003	DP	Subsurface Soil	10'	1-10'	X	DU12-S003-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S003	DP	Surface Soil	10'	0-1'	X	DU12-S003-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S004	DP	Subsurface Soil	10'	1-10'	X	DU12-S004-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S004	DP	Surface Soil	10'	0-1'	X	DU12-S004-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

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DU12-S005	DP	Subsurface Soil	10'	1-10'	X	DU12-S005-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S005	DP	Surface Soil	10'	0-1'	X	DU12-S005-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S006	DP	Subsurface Soil	10'	1-10'	X	DU12-S006-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S006	DP	Surface Soil	10'	0-1'	X	DU12-S006-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S007	DP	Subsurface Soil	10'	1-10'	X	DU12-S007-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S007	DP	Surface Soil	10'	0-1'	X	DU12-S007-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S008	DP	Subsurface Soil	10'	1-10'	X	DU12-S008-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S008	DP	Surface Soil	10'	0-1'	X	DU12-S008-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S009	DP	Subsurface Soil	10'	1-10'	X	DU12-S009-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S009	DP	Surface Soil	10'	0-1'	X	DU12-S009-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S010	DP	Subsurface Soil	10'	1-10'	X	DU12-S010-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S010	DP	Surface Soil	10'	0-1'	X	DU12-S010-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S011	DP	Subsurface Soil	10'	1-10'	X	DU12-S011-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S011	DP	Surface Soil	10'	0-1'	X	DU12-S011-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S012	DP	Subsurface Soil	10'	1-10'	X	DU12-S012-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S012	DP	Surface Soil	10'	0-1'	X	DU12-S012-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S013	DP	Subsurface Soil	10'	1-10'	X	DU12-S013-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S013	DP	Surface Soil	10'	0-1'	X	DU12-S013-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S014	DP	Subsurface Soil	10'	1-10'	X	DU12-S014-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S014	DP	Surface Soil	10'	0-1'	X	DU12-S014-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S015	DP	Subsurface Soil	10'	1-10'	X	DU12-S015-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S015	DP	Surface Soil	10'	0-1'	X	DU12-S015-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU12-S016	DP	Subsurface Soil	10'	1-10'	X	DU12-S016-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU12-S016	DP	Surface Soil	10'	0-1'	X	DU12-S016-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13														
DU13-S001	HA	Surface Soil	N/A	0-1'		DU13-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU13-S002	HA	Surface Soil	N/A	0-1'		DU13-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S003	HA	Surface Soil	N/A	0-1'		DU13-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S004	HA	Surface Soil	N/A	0-1'		DU13-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S005	HA	Surface Soil	N/A	0-1'		DU13-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S006	HA	Surface Soil	N/A	0-1'		DU13-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S007	HA	Surface Soil	N/A	0-1'		DU13-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S008	HA	Surface Soil	N/A	0-1'		DU13-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S009	HA	Surface Soil	N/A	0-1'		DU13-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S010	HA	Surface Soil	N/A	0-1'		DU13-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S011	HA	Surface Soil	N/A	0-1'		DU13-S011-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen	Field Sample ID	Target Parameters							Rationale/Comments
					PID		VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	
DU13-S012	HA	Surface Soil	N/A	0-1'		DU13-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S013	HA	Surface Soil	N/A	0-1'		DU13-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S014	HA	Surface Soil	N/A	0-1'		DU13-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S015	HA	Surface Soil	N/A	0-1'		DU13-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU13-S016	HA	Surface Soil	N/A	0-1'		DU13-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14														
DU14-S001	DP	Subsurface Soil	10'	1-10'	X	DU14-S001-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S001	DP	Surface Soil	10'	0-1'	X	DU14-S001-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S002	DP	Subsurface Soil	10'	1-10'	X	DU14-S002-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S002	DP	Surface Soil	10'	0-1'	X	DU14-S002-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S003	DP	Subsurface Soil	10'	1-10'	X	DU14-S003-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S003	DP	Surface Soil	10'	0-1'	X	DU14-S003-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S004	DP	Subsurface Soil	10'	1-10'	X	DU14-S004-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S004	DP	Surface Soil	10'	0-1'	X	DU14-S004-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S005	DP	Subsurface Soil	10'	1-10'	X	DU14-S005-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S005	DP	Surface Soil	10'	0-1'	X	DU14-S005-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S006	DP	Subsurface Soil	10'	1-10'	X	DU14-S006-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S006	DP	Surface Soil	10'	0-1'	X	DU14-S006-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S007	DP	Subsurface Soil	10'	1-10'	X	DU14-S007-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S007	DP	Surface Soil	10'	0-1'	X	DU14-S007-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S008	DP	Subsurface Soil	10'	1-10'	X	DU14-S008-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S008	DP	Surface Soil	10'	0-1'	X	DU14-S008-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S009	DP	Subsurface Soil	10'	1-10'	X	DU14-S009-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S009	DP	Surface Soil	10'	0-1'	X	DU14-S009-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S010	DP	Subsurface Soil	10'	1-10'	X	DU14-S010-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S010	DP	Surface Soil	10'	0-1'	X	DU14-S010-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S011	DP	Subsurface Soil	10'	1-10'	X	DU14-S011-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S011	DP	Surface Soil	10'	0-1'	X	DU14-S011-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S012	DP	Subsurface Soil	10'	1-10'	X	DU14-S012-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S012	DP	Surface Soil	10'	0-1'	X	DU14-S012-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S013	DP	Subsurface Soil	10'	1-10'	X	DU14-S013-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S013	DP	Surface Soil	10'	0-1'	X	DU14-S013-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S014	DP	Subsurface Soil	10'	1-10'	X	DU14-S014-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S014	DP	Surface Soil	10'	0-1'	X	DU14-S014-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU14-S015	DP	Subsurface Soil	10'	1-10'	X	DU14-S015-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S015	DP	Surface Soil	10'	0-1'	X	DU14-S015-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
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Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

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SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
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Camp Hero Remedial Investigation
Montauk, New York

					Field Screen		Target Parameters							
Location ID	**Investigation Method**	**Media**	**Target Boring Depth**	**Target Sample Depth**	**PID**	**Field Sample ID**	**VOCs**	**SVOCs**	**PCBs**	**Metals**	**Cr^{6+}**	**GeoChem (pH/ORP)**	**GeoTech**	**Rationale/Comments**
DU14-S016	DP	Subsurface Soil	10'	1-10'	X	DU14-S016-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU14-S016	DP	Surface Soil	10'	0-1'	X	DU14-S016-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health risks.
DU15														
DU15-S001	DP	Subsurface Soil	10'	1-10'	X	DU15-S001-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S001	DP	Surface Soil	10'	0-1'	X	DU15-S001-00-01			X	X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU15-S002	DP	Subsurface Soil	10'	1-10'	X	DU15-S002-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S002	DP	Surface Soil	10'	0-1'	X	DU15-S002-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S003	DP	Subsurface Soil	10'	1-10'	X	DU15-S003-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S003	DP	Surface Soil	10'	0-1'	X	DU15-S003-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S004	DP	Subsurface Soil	10'	1-10'	X	DU15-S004-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S004	DP	Surface Soil	10'	0-1'	X	DU15-S004-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S005	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU15-S005-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S005	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU15-S005-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S006	DP	Subsurface Soil	10'	1-10'	X	DU15-S006-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S006	DP	Surface Soil	10'	0-1'	X	DU15-S006-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S007	DP	Subsurface Soil	10'	1-10'	X	DU15-S007-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S007	DP	Surface Soil	10'	0-1'	X	DU15-S007-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S008	DP	Subsurface Soil	10'	1-10'	X	DU15-S008-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S008	DP	Surface Soil	10'	0-1'	X	DU15-S008-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S009	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU15-S009-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S009	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU15-S009-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S010	DP	Subsurface Soil	10'	1-10'	X	DU15-S010-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S010	DP	Surface Soil	10'	0-1'	X	DU15-S010-00-01			X	X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU15-S011	DP	Subsurface Soil	10'	1-10'	X	DU15-S011-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S011	DP	Surface Soil	10'	0-1'	X	DU15-S011-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S012	DP	Subsurface Soil	10'	1-10'	X	DU15-S012-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S012	DP	Surface Soil	10'	0-1'	X	DU15-S012-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S013	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU15-S013-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S013	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU15-S013-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S014	DP or HA (TBD)	Subsurface Soil	10' or 2'	1-10' or 1-2'	X	DU15-S014-__-__		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon (if wetland conditions are absent) or 1-2 foot horizon (if wetland conditions are present), to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S014	DP or HA (TBD)	Surface Soil	10' or 2'	0-1'	X	DU15-S014-00-01		X		X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S015	DP	Subsurface Soil	10'	1-10'	X	DU15-S015-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S015	DP	Surface Soil	10'	0-1'	X	DU15-S015-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU15-S016	DP	Subsurface Soil	10'	1-10'	X	DU15-S016-01-10			X					To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU15-S016	DP	Surface Soil	10'	0-1'	X	DU15-S016-00-01			X	X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

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DU16														
DU16-S001	DP	Subsurface Soil	10'	1-10'	X	DU16-S001-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S001	DP	Surface Soil	10'	0-1'	X	DU16-S001-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S002	DP	Subsurface Soil	10'	1-10'	X	DU16-S002-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S002	DP	Surface Soil	10'	0-1'	X	DU16-S002-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S003	DP	Subsurface Soil	10'	1-10'	X	DU16-S003-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S003	DP	Surface Soil	10'	0-1'	X	DU16-S003-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S004	DP	Subsurface Soil	10'	1-10'	X	DU16-S004-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S004	DP	Surface Soil	10'	0-1'	X	DU16-S004-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S005	DP	Subsurface Soil	10'	1-10'	X	DU16-S005-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S005	DP	Surface Soil	10'	0-1'	X	DU16-S005-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S006	DP	Subsurface Soil	10'	1-10'	X	DU16-S006-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S006	DP	Surface Soil	10'	0-1'	X	DU16-S006-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S007	DP	Subsurface Soil	10'	1-10'	X	DU16-S007-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S007	DP	Surface Soil	10'	0-1'	X	DU16-S007-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S008	DP	Subsurface Soil	10'	1-10'	X	DU16-S008-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S008	DP	Surface Soil	10'	0-1'	X	DU16-S008-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S009	DP	Subsurface Soil	10'	1-10'	X	DU16-S009-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S009	DP	Surface Soil	10'	0-1'	X	DU16-S009-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S010	DP	Subsurface Soil	10'	1-10'	X	DU16-S010-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S010	DP	Surface Soil	10'	0-1'	X	DU16-S010-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S011	DP	Subsurface Soil	10'	1-10'	X	DU16-S011-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S011	DP	Surface Soil	10'	0-1'	X	DU16-S011-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S012	DP	Subsurface Soil	10'	1-10'	X	DU16-S012-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S012	DP	Surface Soil	10'	0-1'	X	DU16-S012-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S013	DP	Subsurface Soil	10'	1-10'	X	DU16-S013-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S013	DP	Surface Soil	10'	0-1'	X	DU16-S013-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S014	DP	Subsurface Soil	10'	1-10'	X	DU16-S014-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S014	DP	Surface Soil	10'	0-1'	X	DU16-S014-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S015	DP	Subsurface Soil	10'	1-10'	X	DU16-S015-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S015	DP	Surface Soil	10'	0-1'	X	DU16-S015-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU16-S016	DP	Subsurface Soil	10'	1-10'	X	DU16-S016-01-10		X						To collect an unbiased grid of subsurface soil samples from the 1-10 foot horizon, to generate representative subsurface soil EPCs, and to quantify potential human health risks.
DU16-S016	DP	Surface Soil	10'	0-1'	X	DU16-S016-00-01		X						To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interval
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-1
Soil Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Boring Depth	Target Sample Depth	Field Screen PID	Field Sample ID	Target Parameters: VOCs	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	GeoTech	Rationale/Comments
DU17														
DU17-S001	HA	Surface Soil	N/A	0-1'		DU17-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU17-S002	HA	Surface Soil	N/A	0-1'		DU17-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S003	HA	Surface Soil	N/A	0-1'		DU17-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S004	HA	Surface Soil	N/A	0-1'		DU17-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S005	HA	Surface Soil	N/A	0-1'		DU17-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S006	HA	Surface Soil	N/A	0-1'		DU17-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S007	HA	Surface Soil	N/A	0-1'		DU17-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S008	HA	Surface Soil	N/A	0-1'		DU17-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S009	HA	Surface Soil	N/A	0-1'		DU17-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S010	HA	Surface Soil	N/A	0-1'		DU17-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S011	HA	Surface Soil	N/A	0-1'		DU17-S011-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU17-S012	HA	Surface Soil	N/A	0-1'		DU17-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S013	HA	Surface Soil	N/A	0-1'		DU17-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S014	HA	Surface Soil	N/A	0-1'		DU17-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S015	HA	Surface Soil	N/A	0-1'		DU17-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU17-S016	HA	Surface Soil	N/A	0-1'		DU17-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18														
DU18-S001	HA	Surface Soil	N/A	0-1'		DU18-S001-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU18-S002	HA	Surface Soil	N/A	0-1'		DU18-S002-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S003	HA	Surface Soil	N/A	0-1'		DU18-S003-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S004	HA	Surface Soil	N/A	0-1'		DU18-S004-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S005	HA	Surface Soil	N/A	0-1'		DU18-S005-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S006	HA	Surface Soil	N/A	0-1'		DU18-S006-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S007	HA	Surface Soil	N/A	0-1'		DU18-S007-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S008	HA	Surface Soil	N/A	0-1'		DU18-S008-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S009	HA	Surface Soil	N/A	0-1'		DU18-S009-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S010	HA	Surface Soil	N/A	0-1'		DU18-S010-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S011	HA	Surface Soil	N/A	0-1'		DU18-S011-00-01				X	X	X		To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
DU18-S012	HA	Surface Soil	N/A	0-1'		DU18-S012-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S013	HA	Surface Soil	N/A	0-1'		DU18-S013-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S014	HA	Surface Soil	N/A	0-1'		DU18-S014-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S015	HA	Surface Soil	N/A	0-1'		DU18-S015-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.
DU18-S016	HA	Surface Soil	N/A	0-1'		DU18-S016-00-01				X				To collect an unbiased grid of surface soil samples from the 0-1 foot horizon, to generate representative surface soil EPCs, and to quantify potential human health and ecological risks.

Notes:
Subsurface soil sample depths may be modified in the field based on actual field conditions (i.e., field screening, soil types, depth to water)
__-__ represents depth below ground surface to top and bottom of sample interva
Investigation Method: HA = hand auger, DP = Direct Push Soil Boring, SN = Sonic Soil Boring
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as hexavalent chromium) and to support the FS
GeoTech - Specific subsurface physical characteristic data to evaluate potential LNAPL response actions
ORP - Oxidation-Reduction Potential

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD001	SD	Sediment	0-0.5'		CH-SWSD001-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD001	SW	Surface Water	N/A	X	CH-SWSD001-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD002	SD	Sediment	0-0.5'		CH-SWSD002-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD002	SW	Surface Water	N/A	X	CH-SWSD002-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD003	SD	Sediment	0-0.5'		CH-SWSD003-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD003	SW	Surface Water	N/A	X	CH-SWSD003-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD004	SD	Sediment	0-0.5'		CH-SWSD004-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD004	SW	Surface Water	N/A	X	CH-SWSD004-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD005	SD	Sediment	0-0.5'		CH-SWSD005-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD005	SW	Surface Water	N/A	X	CH-SWSD005-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD006	SD	Sediment	0-0.5'		CH-SWSD006-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD006	SW	Surface Water	N/A	X	CH-SWSD006-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD007	SD	Sediment	0-0.5'		CH-SWSD007-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD007	SW	Surface Water	N/A	X	CH-SWSD007-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD008	SD	Sediment	0-0.5'		CH-SWSD008-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD008	SW	Surface Water	N/A	X	CH-SWSD008-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD009	SD	Sediment	0-0.5'		CH-SWSD009-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD009	SW	Surface Water	N/A	X	CH-SWSD009-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD010	SD	Sediment	0-0.5'		CH-SWSD010-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD010	SW	Surface Water	N/A	X	CH-SWSD010-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD011	SD	Sediment	0-0.5'		CH-SWSD011-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD011	SW	Surface Water	N/A	X	CH-SWSD011-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD012	SD	Sediment	0-0.5'		CH-SWSD012-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD012	SW	Surface Water	N/A	X	CH-SWSD012-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD013	SD	Sediment	0-0.5'		CH-SWSD013-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD013	SW	Surface Water	N/A	X	CH-SWSD013-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD014	SD	Sediment	0-0.5'		CH-SWSD014-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD014	SW	Surface Water	N/A	X	CH-SWSD014-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD015	SD	Sediment	0-0.5'		CH-SWSD015-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background/reference dataset SVOCs and TAL metals in sediment within the non-revetted streams.
CH-SWSD015	SW	Surface Water	N/A	X	CH-SWSD015-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background/reference dataset for SVOCs and TAL metals in surface water within the non-revetted streams.
CH-SWSD016	SD	Sediment	0-0.5'		CH-SWSD016-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD016	SW	Surface Water	N/A	X	CH-SWSD016-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD017	SD	Sediment	0-0.5'		CH-SWSD017-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD017	SW	Surface Water	N/A	X	CH-SWSD017-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD018	SD	Sediment	0-0.5'		CH-SWSD018-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD018	SW	Surface Water	N/A	X	CH-SWSD018-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD019	SD	Sediment	0-0.5'		CH-SWSD019-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD019	SW	Surface Water	N/A	X	CH-SWSD019-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD020	SD	Sediment	0-0.5'		CH-SWSD020-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD020	SW	Surface Water	N/A	X	CH-SWSD020-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD021	SD	Sediment	0-0.5'		CH-SWSD021-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD021	SW	Surface Water	N/A	X	CH-SWSD021-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD022	SD	Sediment	0-0.5'		CH-SWSD022-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD022	SW	Surface Water	N/A	X	CH-SWSD022-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD023	SD	Sediment	0-0.5'		CH-SWSD023-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD023	SW	Surface Water	N/A	X	CH-SWSD023-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD024	SD	Sediment	0-0.5'		CH-SWSD024-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD024	SW	Surface Water	N/A	X	CH-SWSD024-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD025	SD	Sediment	0-0.5'		CH-SWSD025-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD025	SW	Surface Water	N/A	X	CH-SWSD025-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD026	SD	Sediment	0-0.5'		CH-SWSD026-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD026	SW	Surface Water	N/A	X	CH-SWSD026-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD027	SD	Sediment	0-0.5'		CH-SWSD027-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD027	SW	Surface Water	N/A	X	CH-SWSD027-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD028	SD	Sediment	0-0.5'		CH-SWSD028-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD028	SW	Surface Water	N/A	X	CH-SWSD028-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD029	SD	Sediment	0-0.5'		CH-SWSD029-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD029	SW	Surface Water	N/A	X	CH-SWSD029-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD030	SD	Sediment	0-0.5'		CH-SWSD030-SD01	X		X	X	X	X		N/A (Background)	To collect an upgradient, site-specific background dataset SVOCs and TAL metals in sediment within the revetted streams.
CH-SWSD030	SW	Surface Water	N/A	X	CH-SWSD030-SW01	X		X	X			X	N/A (Background)	To collect an upgradient, site-specific background dataset for SVOCs and TAL metals in surface water within the revetted streams.
CH-SWSD031	SD	Sediment	0-0.5'		CH-SWSD031-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD031	SW	Surface Water	N/A	X	CH-SWSD031-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD032	SD	Sediment	0-0.5'		CH-SWSD032-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD032	SW	Surface Water	N/A	X	CH-SWSD032-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters	Field Sample ID	Target Laboratory Parameters							Exposure Area	Rationale/Comments
				pH, ORP, spCond, DO, Turb		SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness		
CH-SWSD033	SD	Sediment	0-0.5'		CH-SWSD033-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD033	SW	Surface Water	N/A	X	CH-SWSD033-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD034	SD	Sediment	0-0.5'		CH-SWSD034-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD034	SW	Surface Water	N/A	X	CH-SWSD034-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD035	SD	Sediment	0-0.5'		CH-SWSD035-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD035	SW	Surface Water	N/A	X	CH-SWSD035-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD036	SD	Sediment	0-0.5'		CH-SWSD036-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD036	SW	Surface Water	N/A	X	CH-SWSD036-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD037	SD	Sediment	0-0.5'		CH-SWSD037-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD037	SW	Surface Water	N/A	X	CH-SWSD037-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD038	SD	Sediment	0-0.5'		CH-SWSD038-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD038	SW	Surface Water	N/A	X	CH-SWSD038-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD039	SD	Sediment	0-0.5'		CH-SWSD039-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD039	SW	Surface Water	N/A	X	CH-SWSD039-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD040	SD	Sediment	0-0.5'		CH-SWSD040-SD01	X		X	X	X	X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD040	SW	Surface Water	N/A	X	CH-SWSD040-SW01	X		X	X			X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD041	SD	Sediment	0-0.5'		CH-SWSD041-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD041	SW	Surface Water	N/A	X	CH-SWSD041-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD042	SD	Sediment	0-0.5'		CH-SWSD042-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD042	SW	Surface Water	N/A	X	CH-SWSD042-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD043	SD	Sediment	0-0.5'		CH-SWSD043-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD043	SW	Surface Water	N/A	X	CH-SWSD043-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD044	SD	Sediment	0-0.5'		CH-SWSD044-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD044	SW	Surface Water	N/A	X	CH-SWSD044-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD045	SD	Sediment	0-0.5'		CH-SWSD045-SD01	X		X			X		Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD045	SW	Surface Water	N/A	X	CH-SWSD045-SW01	X		X				X	Near DU07	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD046	SD	Sediment	0-0.5'		CH-SWSD046-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD046	SW	Surface Water	N/A	X	CH-SWSD046-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD047	SD	Sediment	0-0.5'		CH-SWSD047-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD047	SW	Surface Water	N/A	X	CH-SWSD047-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD048	SD	Sediment	0-0.5'		CH-SWSD048-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD048	SW	Surface Water	N/A	X	CH-SWSD048-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD049	SD	Sediment	0-0.5'		CH-SWSD049-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD049	SW	Surface Water	N/A	X	CH-SWSD049-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD050	SD	Sediment	0-0.5'		CH-SWSD050-SD01	X		X	X	X	X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD050	SW	Surface Water	N/A	X	CH-SWSD050-SW01	X		X	X			X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD051	SD	Sediment	0-0.5'		CH-SWSD051-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD051	SW	Surface Water	N/A	X	CH-SWSD051-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD052	SD	Sediment	0-0.5'		CH-SWSD052-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD052	SW	Surface Water	N/A	X	CH-SWSD052-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD053	SD	Sediment	0-0.5'		CH-SWSD053-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD053	SW	Surface Water	N/A	X	CH-SWSD053-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD054	SD	Sediment	0-0.5'		CH-SWSD054-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD054	SW	Surface Water	N/A	X	CH-SWSD054-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
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SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters	Field Sample ID	Target Laboratory Parameters							Exposure Area	Rationale/Comments
				pH, ORP, spCond, DO, Turb		SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness		
CH-SWSD055	SD	Sediment	0-0.5'		CH-SWSD055-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD055	SW	Surface Water	N/A	X	CH-SWSD055-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD056	SD	Sediment	0-0.5'		CH-SWSD056-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD056	SW	Surface Water	N/A	X	CH-SWSD056-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD057	SD	Sediment	0-0.5'		CH-SWSD057-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD057	SW	Surface Water	N/A	X	CH-SWSD057-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD058	SD	Sediment	0-0.5'		CH-SWSD058-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD058	SW	Surface Water	N/A	X	CH-SWSD058-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD059	SD	Sediment	0-0.5'		CH-SWSD059-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD059	SW	Surface Water	N/A	X	CH-SWSD059-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD060	SD	Sediment	0-0.5'		CH-SWSD060-SD01	X		X	X	X	X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD060	SW	Surface Water	N/A	X	CH-SWSD060-SW01	X		X	X			X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD061	SD	Sediment	0-0.5'		CH-SWSD061-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD061	SW	Surface Water	N/A	X	CH-SWSD061-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD062	SD	Sediment	0-0.5'		CH-SWSD062-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD062	SW	Surface Water	N/A	X	CH-SWSD062-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD063	SD	Sediment	0-0.5'		CH-SWSD063-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD063	SW	Surface Water	N/A	X	CH-SWSD063-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD064	SD	Sediment	0-0.5'		CH-SWSD064-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD064	SW	Surface Water	N/A	X	CH-SWSD064-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD065	SD	Sediment	0-0.5'		CH-SWSD065-SD01	X		X			X		Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD065	SW	Surface Water	N/A	X	CH-SWSD065-SW01	X		X				X	Near DU11, DU12, DU17	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters: pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters: SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD066	SD	Sediment	0-0.5'		CH-SWSD066-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD066	SW	Surface Water	N/A	X	CH-SWSD066-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD067	SD	Sediment	0-0.5'		CH-SWSD067-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD067	SW	Surface Water	N/A	X	CH-SWSD067-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD068	SD	Sediment	0-0.5'		CH-SWSD068-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD068	SW	Surface Water	N/A	X	CH-SWSD068-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD069	SD	Sediment	0-0.5'		CH-SWSD069-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD069	SW	Surface Water	N/A	X	CH-SWSD069-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD070	SD	Sediment	0-0.5'		CH-SWSD070-SD01	X		X	X	X	X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD070	SW	Surface Water	N/A	X	CH-SWSD070-SW01	X		X	X			X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD071	SD	Sediment	0-0.5'		CH-SWSD071-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD071	SW	Surface Water	N/A	X	CH-SWSD071-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD072	SD	Sediment	0-0.5'		CH-SWSD072-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD072	SW	Surface Water	N/A	X	CH-SWSD072-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD073	SD	Sediment	0-0.5'		CH-SWSD073-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD073	SW	Surface Water	N/A	X	CH-SWSD073-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD074	SD	Sediment	0-0.5'		CH-SWSD074-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD074	SW	Surface Water	N/A	X	CH-SWSD074-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD075	SD	Sediment	0-0.5'		CH-SWSD075-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD075	SW	Surface Water	N/A	X	CH-SWSD075-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD076	SD	Sediment	0-0.5'		CH-SWSD076-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD076	SW	Surface Water	N/A	X	CH-SWSD076-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD077	SD	Sediment	0-0.5'		CH-SWSD077-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD077	SW	Surface Water	N/A	X	CH-SWSD077-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD078	SD	Sediment	0-0.5'		CH-SWSD078-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD078	SW	Surface Water	N/A	X	CH-SWSD078-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD079	SD	Sediment	0-0.5'		CH-SWSD079-SD01	X		X			X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD079	SW	Surface Water	N/A	X	CH-SWSD079-SW01	X		X				X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD080	SD	Sediment	0-0.5'		CH-SWSD080-SD01	X		X	X	X	X		Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD080	SW	Surface Water	N/A	X	CH-SWSD080-SW01	X		X	X			X	Near DU10, DU11	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD081	SD	Sediment	0-0.5'		CH-SWSD081-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD081	SW	Surface Water	N/A	X	CH-SWSD081-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD082	SD	Sediment	0-0.5'		CH-SWSD082-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD082	SW	Surface Water	N/A	X	CH-SWSD082-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD083	SD	Sediment	0-0.5'		CH-SWSD083-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD083	SW	Surface Water	N/A	X	CH-SWSD083-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD084	SD	Sediment	0-0.5'		CH-SWSD084-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD084	SW	Surface Water	N/A	X	CH-SWSD084-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD085	SD	Sediment	0-0.5'		CH-SWSD085-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD085	SW	Surface Water	N/A	X	CH-SWSD085-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD086	SD	Sediment	0-0.5'		CH-SWSD086-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD086	SW	Surface Water	N/A	X	CH-SWSD086-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD087	SD	Sediment	0-0.5'		CH-SWSD087-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD087	SW	Surface Water	N/A	X	CH-SWSD087-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters: pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters: SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD088	SD	Sediment	0-0.5'		CH-SWSD088-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD088	SW	Surface Water	N/A	X	CH-SWSD088-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD089	SD	Sediment	0-0.5'		CH-SWSD089-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD089	SW	Surface Water	N/A	X	CH-SWSD089-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD090	SD	Sediment	0-0.5'		CH-SWSD090-SD01	X		X	X	X	X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD090	SW	Surface Water	N/A	X	CH-SWSD090-SW01	X		X	X			X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD091	SD	Sediment	0-0.5'		CH-SWSD091-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD091	SW	Surface Water	N/A	X	CH-SWSD091-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD092	SD	Sediment	0-0.5'		CH-SWSD092-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD092	SW	Surface Water	N/A	X	CH-SWSD092-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD093	SD	Sediment	0-0.5'		CH-SWSD093-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD093	SW	Surface Water	N/A	X	CH-SWSD093-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD094	SD	Sediment	0-0.5'		CH-SWSD094-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD094	SW	Surface Water	N/A	X	CH-SWSD094-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD095	SD	Sediment	0-0.5'		CH-SWSD095-SD01	X		X			X		Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Downgradient samples are currently inaccessible; sample locations will be adjusted if downgradient area becomes accessible due to vegetation removal.
CH-SWSD095	SW	Surface Water	N/A	X	CH-SWSD095-SW01	X		X				X	Near DU13, DU14	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Downgradient samples are currently inaccessible; sample locations will be adjusted if downgradient area becomes accessible due to vegetation removal.
CH-SWSD096	SD	Sediment	0-0.5'		CH-SWSD096-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD096	SW	Surface Water	N/A	X	CH-SWSD096-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD097	SD	Sediment	0-0.5'		CH-SWSD097-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD097	SW	Surface Water	N/A	X	CH-SWSD097-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD098	SD	Sediment	0-0.5'		CH-SWSD098-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD098	SW	Surface Water	N/A	X	CH-SWSD098-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
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SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
ORP - Oxidation-Reduction Potential
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Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD099	SD	Sediment	0-0.5'		CH-SWSD099-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD099	SW	Surface Water	N/A	X	CH-SWSD099-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD100	SD	Sediment	0-0.5'		CH-SWSD100-SD01	X		X	X	X	X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD100	SW	Surface Water	N/A	X	CH-SWSD100-SW01	X		X	X			X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD101	SD	Sediment	0-0.5'		CH-SWSD101-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD101	SW	Surface Water	N/A	X	CH-SWSD101-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD102	SD	Sediment	0-0.5'		CH-SWSD102-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD102	SW	Surface Water	N/A	X	CH-SWSD102-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD103	SD	Sediment	0-0.5'		CH-SWSD103-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD103	SW	Surface Water	N/A	X	CH-SWSD103-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD104	SD	Sediment	0-0.5'		CH-SWSD104-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD104	SW	Surface Water	N/A	X	CH-SWSD104-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD105	SD	Sediment	0-0.5'		CH-SWSD105-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD105	SW	Surface Water	N/A	X	CH-SWSD105-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD106	SD	Sediment	0-0.5'		CH-SWSD106-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD106	SW	Surface Water	N/A	X	CH-SWSD106-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD107	SD	Sediment	0-0.5'		CH-SWSD107-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD107	SW	Surface Water	N/A	X	CH-SWSD107-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD108	SD	Sediment	0-0.5'		CH-SWSD108-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD108	SW	Surface Water	N/A	X	CH-SWSD108-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD109	SD	Sediment	0-0.5'		CH-SWSD109-SD01	X		X			X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD109	SW	Surface Water	N/A	X	CH-SWSD109-SW01	X		X				X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters: pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters: SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD110	SD	Sediment	0-0.5'		CH-SWSD110-SD01	X		X	X	X	X		Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD110	SW	Surface Water	N/A	X	CH-SWSD110-SW01	X		X	X			X	Near DU05, DU06	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD111	SD	Sediment	0-0.5'		CH-SWSD111-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD111	SW	Surface Water	N/A	X	CH-SWSD111-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD112	SD	Sediment	0-0.5'		CH-SWSD112-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD112	SW	Surface Water	N/A	X	CH-SWSD112-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD113	SD	Sediment	0-0.5'		CH-SWSD113-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD113	SW	Surface Water	N/A	X	CH-SWSD113-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD114	SD	Sediment	0-0.5'		CH-SWSD114-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD114	SW	Surface Water	N/A	X	CH-SWSD114-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD115	SD	Sediment	0-0.5'		CH-SWSD115-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD115	SW	Surface Water	N/A	X	CH-SWSD115-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD116	SD	Sediment	0-0.5'		CH-SWSD116-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD116	SW	Surface Water	N/A	X	CH-SWSD116-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD117	SD	Sediment	0-0.5'		CH-SWSD117-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD117	SW	Surface Water	N/A	X	CH-SWSD117-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD118	SD	Sediment	0-0.5'		CH-SWSD118-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD118	SW	Surface Water	N/A	X	CH-SWSD118-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD119	SD	Sediment	0-0.5'		CH-SWSD119-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD119	SW	Surface Water	N/A	X	CH-SWSD119-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD120	SD	Sediment	0-0.5'		CH-SWSD120-SD01	X		X	X	X	X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD120	SW	Surface Water	N/A	X	CH-SWSD120-SW01	X		X	X			X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters pH, ORP, spCond, DO, Turb	Field Sample ID	Target Laboratory Parameters SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD121	SD	Sediment	0-0.5'		CH-SWSD121-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD121	SW	Surface Water	N/A	X	CH-SWSD121-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD122	SD	Sediment	0-0.5'		CH-SWSD122-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD122	SW	Surface Water	N/A	X	CH-SWSD122-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD123	SD	Sediment	0-0.5'		CH-SWSD123-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD123	SW	Surface Water	N/A	X	CH-SWSD123-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD124	SD	Sediment	0-0.5'		CH-SWSD124-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD124	SW	Surface Water	N/A	X	CH-SWSD124-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD125	SD	Sediment	0-0.5'		CH-SWSD125-SD01	X		X			X		Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD125	SW	Surface Water	N/A	X	CH-SWSD125-SW01	X		X				X	Near DU01, DU02, DU03	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD126	SD	Sediment	0-0.5'		CH-SWSD126-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD126	SW	Surface Water	N/A	X	CH-SWSD126-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD127	SD	Sediment	0-0.5'		CH-SWSD127-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD127	SW	Surface Water	N/A	X	CH-SWSD127-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD128	SD	Sediment	0-0.5'		CH-SWSD128-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD128	SW	Surface Water	N/A	X	CH-SWSD128-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD129	SD	Sediment	0-0.5'		CH-SWSD129-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD129	SW	Surface Water	N/A	X	CH-SWSD129-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD130	SD	Sediment	0-0.5'		CH-SWSD130-SD01	X	X	X	X	X	X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD130	SW	Surface Water	N/A	X	CH-SWSD130-SW01	X	X	X	X			X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD131	SD	Sediment	0-0.5'		CH-SWSD131-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD131	SW	Surface Water	N/A	X	CH-SWSD131-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

				Target Field Parameters		Target Laboratory Parameters								
Location ID	Investigation Method	Media	Target Depth	pH, ORP, spCond, DO, Turb	Field Sample ID	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD132	SD	Sediment	0-0.5'		CH-SWSD132-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD132	SW	Surface Water	N/A	X	CH-SWSD132-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD133	SD	Sediment	0-0.5'		CH-SWSD133-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD133	SW	Surface Water	N/A	X	CH-SWSD133-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD134	SD	Sediment	0-0.5'		CH-SWSD134-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD134	SW	Surface Water	N/A	X	CH-SWSD134-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD135	SD	Sediment	0-0.5'		CH-SWSD135-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD135	SW	Surface Water	N/A	X	CH-SWSD135-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD136	SD	Sediment	0-0.5'		CH-SWSD136-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD136	SW	Surface Water	N/A	X	CH-SWSD136-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD137	SD	Sediment	0-0.5'		CH-SWSD137-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD137	SW	Surface Water	N/A	X	CH-SWSD137-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD138	SD	Sediment	0-0.5'		CH-SWSD138-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD138	SW	Surface Water	N/A	X	CH-SWSD138-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD139	SD	Sediment	0-0.5'		CH-SWSD139-SD01	X	X	X			X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD139	SW	Surface Water	N/A	X	CH-SWSD139-SW01	X	X	X				X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments.
CH-SWSD140	SD	Sediment	0-0.5'		CH-SWSD140-SD01	X	X	X	X	X	X		Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD140	SW	Surface Water	N/A	X	CH-SWSD140-SW01	X	X	X	X			X	Near DU15	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions.
CH-SWSD141	SD	Sediment	0-0.5'		CH-SWSD141-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD141	SW	Surface Water	N/A	X	CH-SWSD141-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr6+) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

				Target Field Parameters		Target Laboratory Parameters								
Location ID	Investigation Method	Media	Target Depth	pH, ORP, spCond, DO, Turb	Field Sample ID	SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness	Exposure Area	Rationale/Comments
CH-SWSD142	SD	Sediment	0-0.5'		CH-SWSD142-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD142	SW	Surface Water	N/A	X	CH-SWSD142-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD143	SD	Sediment	0-0.5'		CH-SWSD143-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD143	SW	Surface Water	N/A	X	CH-SWSD143-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD144	SD	Sediment	0-0.5'		CH-SWSD144-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD144	SW	Surface Water	N/A	X	CH-SWSD144-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD145	SD	Sediment	0-0.5'		CH-SWSD145-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD145	SW	Surface Water	N/A	X	CH-SWSD145-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD146	SD	Sediment	0-0.5'		CH-SWSD146-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD146	SW	Surface Water	N/A	X	CH-SWSD146-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD147	SD	Sediment	0-0.5'		CH-SWSD147-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD147	SW	Surface Water	N/A	X	CH-SWSD147-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD148	SD	Sediment	0-0.5'		CH-SWSD148-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD148	SW	Surface Water	N/A	X	CH-SWSD148-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD149	SD	Sediment	0-0.5'		CH-SWSD149-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD149	SW	Surface Water	N/A	X	CH-SWSD149-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr^{6+}) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

Table 17-2
Sediment and Surface Water Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Investigation Method	Media	Target Depth	Target Field Parameters	Field Sample ID	Target Laboratory Parameters							Exposure Area	Rationale/Comments
				pH, ORP, spCond, DO, Turb		SVOCs	PCBs	Metals	Cr^{6+}	GeoChem (pH/ORP)	TOC	Hard-ness		
CH-SWSD150	SD	Sediment	0-0.5'		CH-SWSD150-SD01	X		X	X	X	X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD150	SW	Surface Water	N/A	X	CH-SWSD150-SW01	X		X	X			X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals, with pH and ORP to validate results relative to field conditions. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD151	SD	Sediment	0-0.5'		CH-SWSD151-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD151	SW	Surface Water	N/A	X	CH-SWSD151-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD152	SD	Sediment	0-0.5'		CH-SWSD152-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD152	SW	Surface Water	N/A	X	CH-SWSD152-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD153	SD	Sediment	0-0.5'		CH-SWSD153-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD153	SW	Surface Water	N/A	X	CH-SWSD153-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD154	SD	Sediment	0-0.5'		CH-SWSD154-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD154	SW	Surface Water	N/A	X	CH-SWSD154-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD155	SD	Sediment	0-0.5'		CH-SWSD155-SD01	X		X			X		Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.
CH-SWSD155	SW	Surface Water	N/A	X	CH-SWSD155-SW01	X		X				X	Near DU08	To collect a representative set of surface water and sediment samples for exposure areas potentially impacted by DU source areas to refine the CSM and calculate EPCs for human health and ecological risk assessments. If downgradient areas are inaccessible, samples will be relocated within the DU area.

Notes:
All surface water samples will be evaluated for hardness; all sediment samples will be evaluated for TOC.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.
Total (unfiltered) and dissolved (field-filtered) surace water samples will be collected for metals.
SW - Surface Water
SD - Sediment
VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
PCBs - Polychlorinated biphenyls
Metals - Full TAL metals, including mercury
GeoChem - Specific geochemical parameters to further evaluate the speciation of metals (such as Cr^{6+}) and to support the FS
DO - Dissolved Oxygen
ORP - Oxidation-Reduction Potential
TOC - Total Organic Carbon

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Table 17-3
Sitewide Monitoring Well Network Information and Rationale
Camp Hero Remedial Investigation
Montauk, New York

Well ID	Nearby DU(s)/AOC(s)	Boring Depth	Screen Length	Date Installed	Construction	Screened Unit	Monitoring Well Rationale
CH-MW001	Background	25	15	12/6/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW002	Background	30	15	12/5/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW003	Background	30	15	12/5/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW004	Background	35	15	12/6/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW005	Background	31	15	12/7/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW006	Background	31	15	12/7/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW007	Background	40	15	12/6/2016	Flush mount	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW008	Background	20	10	12/7/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW009	Background	25	15	12/7/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW010	Background	25	15	12/7/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW011	Background	27	15	12/6/2016	Flush mount	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW012	Background	30	15	12/7/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW013	Background	31	15	12/5/2016	Stick-Up	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW014	Background	31	15	12/5/2016	Flush mount	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW015	Background	40	15	12/6/2016	Flush mount	Perched Water Table	To obtain site-specific background groundwater data for calculation of BTVs.
CH-MW016	DU01	30	15	12/8/2016	Stick-Up	Perched Water Table	To further assess groundwater associated with the LNAPL and petroleum impacts at DU01.
CH-MW017	DU01	30	15	12/8/2016	Stick-Up	Perched Water Table	To further assess groundwater associated with the LNAPL and petroleum impacts at DU01.
CH-MW018	DU01	20	10	12/8/2016	Stick-Up	Perched Water Table	To further assess groundwater associated with the LNAPL and petroleum impacts at DU01.
CH-MW019	DU01	21	15	12/8/2016	Stick-Up	Perched Water Table	To further assess groundwater associated with the LNAPL and petroleum impacts at DU01.
CH-MW020	DU01	25	15	12/8/2016	Stick-Up	Perched Water Table	To further assess groundwater associated with the LNAPL and petroleum impacts at DU01.
CH-MW021	DU01	25	10	12/7/2016	Stick-Up	Perched Water Table	To further assess groundwater associated with the LNAPL and petroleum impacts at DU01.
CH-MW022	DU01	15	10	Proposed	Stick-Up	Perched Water Table	To further assess groundwater associated with LNAPL and petroleum impacts west of Building 203.
CH-MW023	DU01, AST35/FPH	15	10	Proposed	Stick-Up	Perched Water Table	To further assess groundwater associated with LNAPL and petroleum impacts west of Building 203 (DU01) and in the vicinity of AST35/FPH.
CH-MW024	AST35/FPH	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater in the vicinity of observed potential petroleum impacts downgradient of the AST35/FPH area.
CH-MW025	AST35/FPH	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater downgradient of the AST35/FPH area and upgradient of potential discharge swale.
CH-MW026	STB	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater in the vicinity of a suspected former tank and in the vicinity of observed potential petroleum impacts.
CH-MW027	STB	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater in the vicinity of a suspected former tank and in the vicinity of observed potential petroleum impacts.
CH-MW028	STB	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater in the vicinity of a suspected former tank and in the vicinity of observed potential petroleum impacts.
CH-MW029	DU17	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU17.
CH-MW030	DU12	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU12.
CH-MW031	DU14	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU14.
CH-MW032	DU11	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU11.
CH-MW033	DU11	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU11.
CH-MW034	DU13	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU13.
CH-MW035	DU13	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU13.
CH-MW036	DU08	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU08.
CH-MW037	DU08	15	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU08.
CH-MW038	DU07	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU07.
CH-MW039	DU07	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU07.
CH-MW040	DU15	12	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU15. PCBs were previously detected in a grab groundwater sample from a temporary monitoring well.
CH-MW041	DU06	12	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU06.
CH-MW042	DU06	12	10	Proposed	Stick-Up	Perched Water Table	To assess groundwater conditions sitewide and in the vicinity of DU06.
CH-MW043	MP	20	15	Proposed	Stick-Up	Perched Water Table	To assess groundwater in the vicinity of observed potential petroleum impacts near the Motor Pool hydraulic lift.

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Table 17-4
Groundwater Sampling Rationale Table
Camp Hero Remedial Investigation
Montauk, New York

					Target Field Parameters						Target Laboratory Parameters						
Location ID	Nearby DU(s)/AOC(s)	Investigation Method	Media	Target Depth	Well Head PID	LNAPL Thickness	Hydraulic Conduct-ivity	pH, ORP, spCond, DO, Turb	Fe^{3+} Total and Dissolved	Field Sample ID	VOCs	SVOCs Total and Dissolved	PCBs Total and Dissolved	Metals Total and Dissolved	Cr^{6+} Total and Dissolved	MNA	Rationale/Comments
CH-MW016	DU01	Low-Flow	Groundwater	Mid-screen	X		X	X	X	CH-MW016-02	X	X		X	X	X	To further assess constituents in groundwater associated with the LNAPL plume at DU01. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals. MNA parameters will be collected to assess the potential for MNA, specific chemical oxidation states, and fate and transport properties.
CH-MW017	DU01	Gauge	Groundwater	Mid-screen	X	X				N/A							LNAPL present in well; groundwater sample should not be collected. LNAPL thickness should be measured to provide information for the CSM and FS.
CH-MW018	DU01	Low-Flow	Groundwater	Mid-screen	X		X	X		CH-MW018-02	X	X		X			To further assess constituents in groundwater associated with the LNAPL plume at DU01.
CH-MW019	DU01	Low-Flow	Groundwater	Mid-screen	X		X	X		CH-MW019-02	X	X		X			To further assess constituents in groundwater associated with the LNAPL plume at DU01.
CH-MW020	DU01	Low-Flow	Groundwater	Mid-screen	X		X	X	X	CH-MW020-02	X	X		X		X	To further assess constituents in groundwater associated with the LNAPL plume at DU01. MNA parameters will be collected to assess the potential for MNA, specific chemical oxidation states, and fate and transport properties. MNA parameters will be collected to assess the potential for MNA, specific chemical oxidation states, and fate and transport properties.
CH-MW021	DU01	Low-Flow	Groundwater	Mid-screen	X		X	X		CH-MW021-02	X	X		X			To further assess constituents in groundwater associated with the LNAPL plume at DU01.
CH-MW022	DU01	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW022-02	X	X		X			To further assess constituents in groundwater associated with the LNAPL plume at DU01.
CH-MW023	DU01, AST35/FPH	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW023-02	X	X		X			To further assess constituents in groundwater associated with the LNAPL plume at DU01 and assess the presence or absence of petroleum impacts near AST35/FPH based on field observations of potential impacts.
CH-MW024	AST35/FPH	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW024-02	X	X		X			To assess groundwater in the vicinity of observed potential petroleum impacts downgradient of the AST35/FPH area.
CH-MW025	AST35/FPH	Low-Flow	Groundwater	Mid-screen	X			X	X	CH-MW025-02	X	X		X		X	To assess groundwater downgradient of the AST35/FPH area and upgradient of potential discharge swale. MNA parameters will be collected to assess the potential for MNA, specific chemical oxidation states, and fate and transport properties.
CH-MW026	STB	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW026-02	X	X		X			To assess groundwater in the vicinity of a suspected former tank and in the vicinity of observed potential petroleum impacts.
CH-MW027	STB	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW027-02	X	X		X			To assess groundwater in the vicinity of a suspected former tank and in the vicinity of observed potential petroleum impacts.
CH-MW028	STB	Low-Flow	Groundwater	Mid-screen	X			X	X	CH-MW028-02	X	X		X		X	To assess groundwater in the vicinity of a suspected former tank and in the vicinity of observed potential petroleum impacts. MNA parameters will be collected to assess the potential for MNA, specific chemical oxidation states, and fate and transport properties.
CH-MW029	DU17	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW029-02		X		X	X		To assess groundwater conditions sitewide and in the vicinity of DU17. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals.
CH-MW030	DU12	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW030-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU12.
CH-MW031	DU14	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW031-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU14.
CH-MW032	DU11	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW032-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU11.
CH-MW033	DU11	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW033-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU11.
CH-MW034	DU13	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW034-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU13.
CH-MW035	DU13	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW035-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU13.
CH-MW036	DU08	Low-Flow	Groundwater	Mid-screen	X			X	X	CH-MW036-02		X		X		X	To assess groundwater conditions sitewide and in the vicinity of DU08.
CH-MW037	DU08	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW037-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU08.
CH-MW038	DU07	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW038-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU07.
CH-MW039	DU07	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW039-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU07.
CH-MW040	DU15	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW040-02		X	X	X			To assess groundwater conditions sitewide and in the vicinity of DU15. PCBs were previously detected in a grab groundwater sample from a temporary monitoring well.
CH-MW041	DU06	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW041-02		X		X			To assess groundwater conditions sitewide and in the vicinity of DU06.
CH-MW042	DU06	Low-Flow	Groundwater	Mid-screen	X			X		CH-MW042-02		X		X	X		To assess groundwater conditions sitewide and in the vicinity of DU06. Cr6+ will be analyzed in 10% of samples analyzed for TAL metals.
CH-MW043	MP	Low-Flow	Groundwater	Mid-screen	X			X	X	CH-MW043-02	X	X		X		X	To assess groundwater in the vicinity of observed potential petroleum impacts near the Motor Pool hydraulic lift.MNA parameters will be collected to assess the potential for MNA, specific chemical oxidation states, and fate and transport properties.

Notes:
Total (unfiltered) and dissolved (field-filtered) samples will be collected for SVOCs, PCBs, Metals, Cr^{6+}, and Fe^{3+}. Filtered samples are not appropriate for VOCs.
MNA parameters will be analyzed in 10% of groundwater samples. MNA parameters consist of biochemical oxygen demand, total oxygen demand, total organic carbon, ferrous iron (field analysis), chlorides, sulfates and sulfides, nitrates and nitrites, alkalinity, methane, ethane, and ethene.
Cr^{6+} will be analyzed in 10% of samples analyzed for TAL metals, along with pH and ORP to validate the analytical results relative to field conditions.

VOCs - Specific parameters from TCL based on preliminary screening evaluation results, plus NYSDEC STARs list
SVOCs - Selected TCL SVOCs based on preliminary screening evaluation, plus NYSDEC STARs list (includes full TCL PAHs plus NYSDEC STARs list)
Metals - Full TAL metals, including mercury
MNA - Monitored natural attenuation parameters to support the FS
LNAPL - Light Non-aqueous Phase Liquid
ORP - Oxidation-Reduction Potential
SpCond - Specific Conductivity
DO - Dissolved Oxygen
Turb - Turbidity

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Appendix C

Background Statistical Results

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Appendix C.1

Background Soil Statistical Results

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TABLE OF CONTENTS

LIST OF ATTACHMENTS

FIGURES (ATTACHMENT B)

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BaP	benzo(a)pyrene
BTV	background threshold value
DoD	Department of Defense
DQO	data quality objective
FUDS	formerly used defense site
HHRA	Human Health Risk Assessment
HMW	high molecular weight
JV	Joint-Venture
LMW	low molecular weight
LOD	limit of detection
LOQ	limit of quantitation
MDL	method detection limit
mg/kg	milligrams per kilogram
ML	Montauk Loam
NY	New York
PAH	polycyclic aromatic hydrocarbon
PAST	PAleontological STatistics
RI	Remedial Investigation
SLERA	Screening-Level Ecological Risk Assessment
TEF	toxicity equivalence factor
TEQ	toxicity equivalence

UPL	upper prediction limit
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit
WP	Work Plan
WSL	Whitman Sandy Loam

EXECUTIVE SUMMARY

Camp Hero is a formerly used defense site (FUDS) undergoing a Remedial Investigation and Feasibility Study (RI/FS) under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA).

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, New York, approximately 5 miles east of the Village of Montauk. The former Camp Hero was established in early 1942 as a Coastal Defense Installation and the facility changed ownership within the military multiple times over the course of the following decades. Between 1974 and 1984, site lands were transferred to State, Local, and other Federal agencies, and the facility was permanently closed in 1982. The area is now used as Camp Hero State Park and is owned by the New York State Parks Commission.

Former Department of Defense (DoD) activities at Camp Hero may have resulted in contaminated material or an environmental release from these materials at certain Areas of Concern (AOCs). Forty-seven AOCs were identified as part of the RI. The AOCs include former waste disposal areas, former coal storage areas, abandoned drum locations, possible and former underground storage tanks, and a Motor Pool building, among others.

The primary objectives of the background soil study are to: 1) provide soil background threshold values (BTVs) for screening metal and polycyclic aromatic hydrocarbon (PAH) concentrations, and 2) provide background soil data sets for statistical background means comparisons, where needed, for the baseline human health risk assessment (HHRA) and Screening-Level Ecological Risk Assessment (SLERA). Soil BTVs are used to distinguish metal and PAH concentrations within decision units or exposure areas considered in the HHRA or the SLERA from naturally occurring or anthropogenic background conditions. Decision units or exposure areas with chemical concentrations that are above risk-based screening criteria and BTVs and are statistically above the background mean using hypothesis testing are carried forward for further evaluation in the CERCLA process.

U.S. Environmental Protection Agency (USEPA) ProUCL 5.1 statistical software and PAleontological STatistics (PAST) 3.13 data analysis software were used to conduct the statistical analysis of the background soil data. The analysis included summary statistics, goodness-of-fit testing, permutation testing, outlier testing, and finally BTV calculations. Table ES-1 summarizes the BTVs selected for the soil medium.

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1.0 INTRODUCTION

Camp Hero is a formerly used defense site (FUDS) undergoing a Remedial Investigation and Feasibility Study (RI/FS) under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA). A total of 47 areas of concern (AOCs) have been identified during previous investigations, which included Phase I and II RI field investigations. This RI/FS program for Camp Hero is being conducted by AECOM in coordination with the United States Army Corps of Engineers (USACE), New England and New York Districts, as well as the Environmental and Munitions (EM) Center of Expertise (CX).

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, New York, approximately 5 miles east of the Village of Montauk. The former Camp Hero was established in early 1942 as a Coastal Defense Installation and the facility changed ownership within the military multiple times over the course of the following decades. Between 1974 and 1984, site lands were transferred to State, Local, and other Federal agencies, and the facility was permanently closed in 1982. The area is now used as Camp Hero State Park and is owned by the New York State Parks Commission.

Former Department of Defense (DoD) activities at Camp Hero may have resulted in contaminated material or an environmental release from these materials at certain Areas of Concern (AOCs). Forty-seven AOCs were identified as part of the RI. The AOCs include former waste disposal areas, former coal storage areas, abandoned drum locations, possible and former underground storage tanks, and a Motor Pool building, among others.

The purpose of conducting the background study and deriving background threshold values (BTVs) is to help identify what AOCs require further evaluation in the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) Remedial Investigation (RI), Feasibility Study, Proposed Plan, and Decision Document process for Camp Hero.

1.1 Background Soil Study Scope and Objectives

The primary objectives of the background soil study are to: 1) provide soil BTVs for screening metal and polycyclic aromatic hydrocarbon (PAH) concentrations, and 2) provide background soil data sets for statistical background means comparisons, where needed, for the baseline human health risk assessment (HHRA) and Screening-Level Ecological Risk Assessment (SLERA).

1.2 Background Soil Study Organization

This Background Soil Study is organized into the following sections:

- Section 1: Introduction – Describes the purpose of the study, including its scope and objectives.
- Section 2: Data Handling and Evaluation – Describes the soil background data set and how it was used to derive BTVs. This section includes summary statistics, limit of quantitation (LOQ) screening results, outlier testing, and permutation testing.
- Section 3: Development of Background Threshold Values (BTVs) – Describe how the BTVs were derived based on goodness-of-fit (GOF) distribution testing and how non-detects were handled. A brief discussion of the BTV results is also included.

All figures and tables referenced in the text are provided in Attachment B and Attachment D, respectively.

The following attachments are included in this background soil study:

- Attachment A contains the references for the background soil study.
- Attachment B contains the figures showing the background sampling locations.
- Attachment C contains the background data sample results, including the low molecular weight (LMW) PAH, high molecular weight (HMW) PAH, and benzo(a)pyrene (BaP) toxicity equivalence (TEQ) sample results.
- Attachment D contains the background data summary tables.
- Attachment E contains the ProUCL BTV output files.

2.0 DATA HANDLING AND EVALUATION

This section describes the background soil data set and how it was handled to effectively generate soil BTVs.

2.1 Background Soil Data Set

A total of 62 background soil samples (30 surface and 32 subsurface) were collected as part of the Phase I investigation conducted in May and June 2016. The Phase I investigation activities are documented in the Phase I Field Investigation Report (AECOM-Tidewater JV, 2016), which provides the laboratory analytical data reports from the Phase I investigation.

Figures 1 through 5 provided in Attachment B display the locations of the background soil samples. The samples were collected from four different locations (BG-01 through BG-04) representing two different soil types, Whitman Sandy loam (WSL; outwash deposits of stratified sand and gravel) and Montauk loam (ML; glaciofluvial deposits of stratified sand and gravel in forms of kames). These two soil types represent the soil types where most of the Camp Hero RI AOCs are located, excluding urban soil complexes, which are not representative of background conditions (AECOM-Tidewater JV, 2016).

A total of 16 soil borings were advanced for background sampling: 8 borings in the WSL (4 borings at 2 locations) and 8 were located in the ML (4 borings at 2 locations). One surface soil sample was collected from 0 to 1 foot from each boring. Fourteen additional surface soil samples were collected between the four background locations and spaced at a minimum of 25 feet (ft) apart. For subsurface soil, the borings were advanced to 10 ft below ground surface (bgs) or the depth of the perched aquifer, whichever was encountered first. Two subsurface soil samples were collected per boring: 4 to 5 ft bgs and 9 to 10 ft bgs or 1 to 2 ft above the depth to ground water, whichever was encountered first (AECOM-Tidewater JV, 2016).

In summary, the sample sizes for the background soil samples are as follows:

- n = 15 for surface soil in Montauk Loam (at locations BG-02, BG-04)
- n = 15 for surface soil in Whitman Sandy Loam (at locations BG-01, BG-03)
- n = 16 for subsurface soil in Montauk Loam (at locations BG-02, BG-04)
- n = 16 for subsurface soil in Whitman Sandy Loam (at locations BG-01, BG-03)

Attachment C presents the background soil sample results.

2.2 Data Evaluation and Handling

Background samples were analyzed using United States Environmental Protection Agency (USEPA) method SW6010C (metals) and 8270D in SIM mode (PAHs). All validated, qualified data were considered usable for the BTV derivation with the exception of unusable or rejected ("R" qualified) samples. However, no rejected data were identified in the background data sets.

The limit of quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias. The LOQ is typically larger than the limit of detection (LOD; but may be equal to the LOD, depending upon the acceptance limits for precision and bias); therefore, the following is true:

$$\text{Method Detection Limit (MDL)} < \text{LOD} \leq \text{LOQ}$$

Quantitative results can only be achieved at or above the LOQ. Measurements between the MDL and the LOQ assure the presence of the analyte with confidence, but their numeric values are estimates ("J" qualified).

No "B" qualified results (blank contamination) were identified in the background soil data set. However, "J" qualified results (estimated values) were identified and were carried forward as detect results. Where applicable, the average of the field and duplicate samples were used to represent the sample. Tables 1 and 2 (provided in Attachment D) present the summary statistics for surface and subsurface soil. The USEPA's ProUCL 5.1 statistical software was used to generate the summary statistics (USEPA, 2015).

USACE and AECOM discussed the consideration of uncensored analytical data (USACE, 2016), specifically for the analytical results of metals. Uncensored data can be useful to minimize information loss for non-detected analytical results. For the dataset generated for this background evaluation, uncensored analytical data were not available; however, the majority of analytical results, particularly the metals, were detected values.

The analytical results provided by the laboratory were compared to the MDL and LOQ to assess potential distortion of deriving the BTVs. Tables 3 and 4 (provided in Attachment D) present the MDL and LOQ summary for metals and PAHs, respectively. The ML and WSL soil types were kept separate for the metals, but not for the PAHs (USACE, 2016), at this stage for the purpose of exploratory data analysis (EDA).

As previously indicated, most of the metals were detected at 100% or close to 100%, so the use of MDLs, LODs, LOQs, and/or uncensored data was not needed. For selenium and silver where the sample results were mostly non-detects (NDs), the LOD or LOQ was used as the BTV (see Section 3.2).

Cadmium was the only metal with non-detect results where the team needed to consider the MDL, LOD, and/or LOQ rather than the uncensored result. Cadmium was detected at a frequency of 25% to 69% in the four data sets. However, three out of four of these data sets were reported 100% below LOQ, and therefore, the need of numerical values for NDs for statistical evaluation was not required. The surface soil WSL data set for cadmium data had only 2 detected results above LOQ. Since the combined surface soil data set is mostly non-detects, the LOQ is selected as the BTV (see Section 3.2).

In all cases (i.e., for both metals and PAHs), the Kaplan-Meier (KM) method or the regression on order statistics (ROS) method was used in subsequent BTV calculations, when the data set contained non-detect values (see Section 3.2).

2.3 Polycyclic Aromatic Hydrocarbon (PAH) Summation Concentrations

LMW PAH and HMW PAH concentrations were derived for each sample to support the BTV calculations and future SLERA background analysis. PAHs constitute a class of organic substances that are made up of carbon and hydrogen atoms grouped into at least two condensed aromatic ring structures. The LMW PAHs are composed of fewer than four rings and HMW PAHs are composed of four or more rings. The bioavailability of PAHs in soil is influenced by organic carbon quality and quantity, aging and weather, microbial action, methylation/hydroxylation, adsorption/desorption hysteresis, and ultra-violet light interaction (Fairbrother, 2005). USEPA has grouped the PAHs into LMW and HMW categories as a means to address the differences in physical/chemical properties of individual PAAHs which influence toxicity and environmental fate (USEPA, 2007). Table 5 presents the LMW and HMW PAHs categories and the molecular weight of each individual PAH.

To derive the LMW and HMW PAH concentrations, the PAHs were broken into the aforementioned categories for each sample result and the concentrations were summed. For data sets with NDs, the MDL was applied and the concentrations were summed using the KM method (Helsel, 2009). Thus, each sample had a representative LMW and HMW PAH concentration value.

BaP TEQ concentrations were derived for each sample to support the BTV calculations and future HHRA background analysis. Carcinogenic PAHs exhibit similar toxicological properties, but they differ in the degree of toxicity. Toxicity equivalence factors (TEFs) were applied to adjust the measured concentration of the carcinogenic PAHs in relation to BaP which is the most toxic. Table 6 presents the carcinogenic PAHs and their corresponding TEFs (USEPA, 1993 and 2016). The individual carcinogenic PAH concentrations were multiplied by the TEF, then the TEF-multiplied concentrations were summed for each sample. When one or more of the carcinogenic PAHs were NDs, similar to LMW and HMW PAHs, the MDL was applied and the TEF-multiplied concentrations were summed using the KM method (Helsel, 2009).

The PAH summation results are provided in Attachment C.

2.4 Outlier Testing

Including potentially erroneous outliers in a background data set tends to generate distorted and inflated estimates of the BTV. USEPA's ProUCL 5.1 statistical software could be used to conduct outlier testing. The Dixon's outlier test was used for sample sizes that were less than 25. The Rosner's test was used for data sets greater than or equal to 25.

Both outlier tests identified extreme values that were much smaller than the rest of the data set (lower tail) and much higher than the rest of the data set (upper tail). Both outlier tests were performed at 5% significance level for identifying an outlier in this background evaluation. A limitation of the outlier testing was that the tests assumed that the data without the outlier were normally distributed, which was not always the case.

Although the statistical outlier tests were useful to identify extreme values; however, outliers were excluded only if a physical justification was also evident, such as gross QC failures for the laboratory analysis, samples collected at the wrong spatial coordinates, or transcription errors, etc. The project team did not identify any issues or errors for all the soil background data collected, and therefore, no statistical outliers or extreme values were excluded in the subsequent BTV calculation.

2.5 Permutation Testing

The objective of the permutation testing was to compare the mean concentrations of each metal for ML and WSL soil types at the surface and subsurface and determine if the means were statistically similar to each other. Another round of permutation testing was also conducted to compare the mean concentrations of the surface and subsurface soil data sets for the metals. Tables 7, 8, and 9 summarize the permutation testing results.

If the mean concentrations were determined to be similar, then the ML and WSL data sets were combined for that particular metal at the specified depth (surface or subsurface). If the mean concentrations were significantly different, then the soil types should be analyzed separately for that particular metal at the specified depth. If the mean concentrations of metals were determined to be similar between the surface and subsurface soil, then the two soil depths may be combined to strengthen the derivation of the BTV.

The USEPA's ProUCL 5.1 statistical software was initially run to calculate summary statistics and perform Goodness of Fit Tests (GOF) for each metal of each soil type at each depth level (Singh and Maichle, 2015). This resulted in the analysis of 22 metals for the following subset groups:

- ML Surface Soil
- WSL Surface Soil

- ML Subsurface Soil
- WSL Subsurface Soil
- Surface Soil and Subsurface Soil

The PAST 3.13 data analysis software was used to: (1) perform test for equal variance, and (2) compare means of ML and WSL surface/subsurface using either the Student's t-test or the permutation test (Monte Carlo, n = 9,999), based on the conditions specified below (Hammer et al., 2001):

- If both soil data sets were normally or approximately normally distributed:
  - Equal variance was tested using the F-test. If the variances were equal, then the Student's t-test was used to test if both mean concentrations were statistically similar.
  - In cases where the F-test rejected the null hypothesis (H0), equal variance was also tested using the non-parametric, Monte Carlo test. Results of the Student's t-test and Monte Carlo permutation test were both reported for the mean comparison.
- If the GOF results for both soil data sets were different, then only the Monte Carlo permutation test was used to compare variance and mean concentrations.
- The H0 stated that the two data sets were taken from populations with equal mean. When $p < 0.05$, the H0 is rejected.
- Outliers were included in all data sets. ND data were censored at the full detection limit.

2.5.1 Surface Metals

For surface metals, equal variance was confirmed for all normally distributed data (10/22 metals). Additionally, the Monte Carlo test confirmed equal variance for all other metals which were not normally distributed (8/22 metals), except antimony and cobalt.

Testing for equal means determined that only arsenic, iron, and manganese rejected the H0 (explained below under Soil Type Analysis).

Both selenium and silver were not tested for GOF, equal variance, or equal means because they had NDs greater than 85% and reliable statistics could not be determined.

2.5.2 Subsurface Metals

For subsurface metals, equal variance was confirmed for half of the normally distributed data set (2/22 metals). Arsenic and chromium were determined to be normally distributed by GOF, but both the F-test and Monte Carlo test rejected the equal variance null hypothesis. Additionally, the Monte Carlo test confirmed equal variance in half of the other metals which were tested (8/22).

Testing for equal means determined that only calcium rejected the H0 (explained below under Soil Type Analysis).

Both selenium and silver were not tested for GOF, equal variance, or equal means because they had NDs equal to 100% and reliable statistics could not be determined.

2.5.3 Discussion of Soil Type Analysis

The Montauk and Whitman soil series occurred in similar geographic locations but varied greatly in drainage and slope, with slightly varied composition in the amounts of granite, gneiss, and schist. The United States Department of Agriculture (USDA) described the Montauk series as well drained soils formed in lodgment or flow till derived primarily from granitic materials with lesser amounts of gneiss and schist (USDA, 2015). The Whitman soil series consisted of very poorly drained soils formed in lodgment till containing granite, gneiss, and schist.

Up to 4 feet in depth, Whitman soil contained masses of iron accumulation (USDA, 2016). ML surface soils within the site had higher mean concentrations of iron than WSL surface soils. The availability of iron in the Whitman series may be restricted due to the accumulation of these masses. The lack of these masses at depth may explain why mean concentrations in subsurface soils were considered equal.

Manganese availability in soil was strongly influenced by pH and the presence of iron in soils. The Montauk series was extremely acidic at the surface with pH decreasing in the subsurface, while the Whitman series was moderately acidic throughout. The relationship with how pH (ML) and iron accumulation (WSL) varied with depth could explain this difference seen at the surface.

The availability of arsenic in soils may be influenced by similar processes and variations with depth, but the presence of arsenic in the environment was largely determined by industrial activities involving lead and copper (ATSDR, 2007). Additionally, inorganic arsenic was used as a pesticide. Without further information about land use practices influencing each area, the higher presence of arsenic in ML soil may not be explained by only soil type.

Calcium was the only metal which had statistically different mean concentrations at subsurface depths. As mentioned previously, ML soils were significantly more acidic than WSL at all depths. ML soil was most acidic at the surface and pH increased with depth. ML soils had significantly more calcium than in the subsurface. This is most likely attributed to surface calcium leaching throughout the profile due to low surface pH and accumulating in the subsurface at higher mean concentrations. This same behavior would not be expected with WSL which had a consistent and higher pH (relative to ML) with depth.

Outliers were included in this evaluation. No outliers were detected for arsenic, iron, or manganese at the surface. However, calcium had upper statistical outliers for both surface and subsurface ML soil (1700 and 2500 mg/kg, respectively) and only subsurface soil for WSL (960 mg/kg). The inclusion of these outliers may have influenced equal means testing, but given the difference in nature of ML and WSL soils with regards to pH and depth, these outliers may be indicative of the differences due to soil type.

Based on the results of testing for equal variance and mean, the ML and WSL results for arsenic, iron and manganese in surface soil, and calcium in subsurface soil should be evaluated separately in deriving the BTVs.

2.5.4 Soil Depth Analysis

Although surface and subsurface soils are generally evaluated separately in the risk assessment, there may be desire to combine data from surface and subsurface soils to derive the BTVs with a larger, more robust data set, when there were no significant differences between different soil depths. As such, the same aforementioned comparison approach was performed for metals between the surface and subsurface data sets. With the exception for arsenic, calcium, iron, and manganese, where either surface or subsurface was determined to be different between soil types, all other metals were compared using the data sets with combined soil types.

Table 9 presents the comparison summary of soil depths. The following metals were determined to have similar mean concentrations between surface and subsurface soils, and thus a combined depth BTV may be considered: aluminum, arsenic, beryllium, calcium, chromium, copper, iron, nickel, selenium, silver, vanadium, and zinc.

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3.0 DEVELOPMENT OF BACKGROUND THRESHOLD VALUES (BTVs)

3.1 Overview of BTV Calculation

For each established background data set described above, the upper tolerance limit (UTL) was derived, which is representative of the upper bound of the data distribution. The assessed UTL95-95 represents the 95% confidence level of the 95% percentile of the background population. The UTL95-95 is a value that represents the upper limit of a tolerance interval such that 95% of the observations from the background population will be less than or equal to that upper-limit value with a confidence coefficient (CC) of 95%. The UTL95-95 is designed to simultaneously provide coverage for 95% of all potential observations (current and future) from the background population with a CC of 95%. The use of UTL95-95 is preferred to upper prediction limit (UPL95) when the number of future comparisons is large or unknown.

From an exceedance perspective, a UTL95-95 is the value that will be exceeded less than 5% of the time by all values potentially coming from the background population, with a CC of 95%. This is true for each chemical analyte. A parametric UTL95-95 takes into account the variability of current and future observations. When the dataset does not follow a discernible distribution, a non-parametric UTL represented by a higher-order statistic (for example, the largest value or the second largest value) will be used as an estimate of BTV. Results derived using the ProUCL software (USEPA 2015) were used to determine UTL95-95 BTVs (see Attachment E). If a dataset follows no discernible distribution, ProUCL determines the order statistic for a non-parametric UTL95-95 based on the sample size. This means that the order statistic to use is not fixed a-priori in ProUCL. The technical details, including the mathematical equation for determining the parametric and non-parametric UTLs, are described in Section 3.4 of the ProUCL Technical Guide (Singh and Singh, 2013). For data sets with non-detects, the technical details are described in Section 5.3.3 of the same document.

3.2 BTV Selection Process

For each established background data set, the normality of the data was first checked using the goodness-of-fit test in the ProUCL software. Based on the ProUCL guidelines, the Shapiro-Wilk W test was used for a sample size of 50 or less and the Lillifors test was used for a sample size greater than 50. If the data fit a normal distribution, the parametric (normal) method was used to derive the associated BTVs.

If the data did not fit a normal distribution, a possible fit to a gamma or lognormal distribution was evaluated. If the data fit a gamma distribution, the parametric (gamma) method was used to derive the BTVs. Otherwise, if the data fit a lognormal distribution, the parametric (lognormal) method was used to derive the BTVs. If the data did not fit any of the three aforementioned parametric distributions, the non-parametric method was used to derive the associated BTVs.

For each established data set containing one or more non-detects, the Kaplan-Meier (KM) method or the regression on order statistics (ROS) method was used to derive the associated BTVs. When a data set entirely consisted of non-detects, the Limit of Detection (LOD) was used as a non-statistical BTV. If a data set entirely or mostly consisted of non-detects and J-qualified results less than the Limit of Quantitation (LOQ), the LOQ was used as a non-statistical BTV.

3.3 Discussion of BTV Results

Tables 10 (surface soil), 11 (subsurface soil), and 12 (combined depths for selected metals) summarize the results of BTV calculation. The goodness-of-fit test results, along with the selected UTL95-95 and UTL calculation methods are presented. The UPL95 is also presented for reference and informational purposes only. Table 13 presents a condensed summary of UTL95-95 results for surface soil, subsurface soil, and combined depths side-by-side. Attachment E presents the statistical outputs from the ProUCL software.

Selenium and silver were entirely or mostly non-detects, and cadmium and thallium (surface only) were entirely or mostly below LOQ. In these cases, the LOD or the LOQ will be used as the non-statistical BTV. All other metals were detected 100% or close to 100% and followed a parametric distribution (normal, gamma, or lognormal). Thus, the background metal data sets were considered to be relatively robust and likely belonged to a single population without extreme values.

For the data sets of surface PAHs, the percentage of non-detects varied from 10% to 90%, and therefore, the KM method or the ROS method was used to calculate UTL95-95. Acenaphthylene and dibenz(a,h)anthracene were not detected over 90% of the surface data set, and thus, the LOQ will be used as the non-statistical BTV. All subsurface PAHs were not detected over 90% of the data set or consisted of 100% non-detects, and therefore, the LOD or the LOQ will be used as the non-statistical BTV.

Attachment A

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Attachment B

Sampling Location Figures

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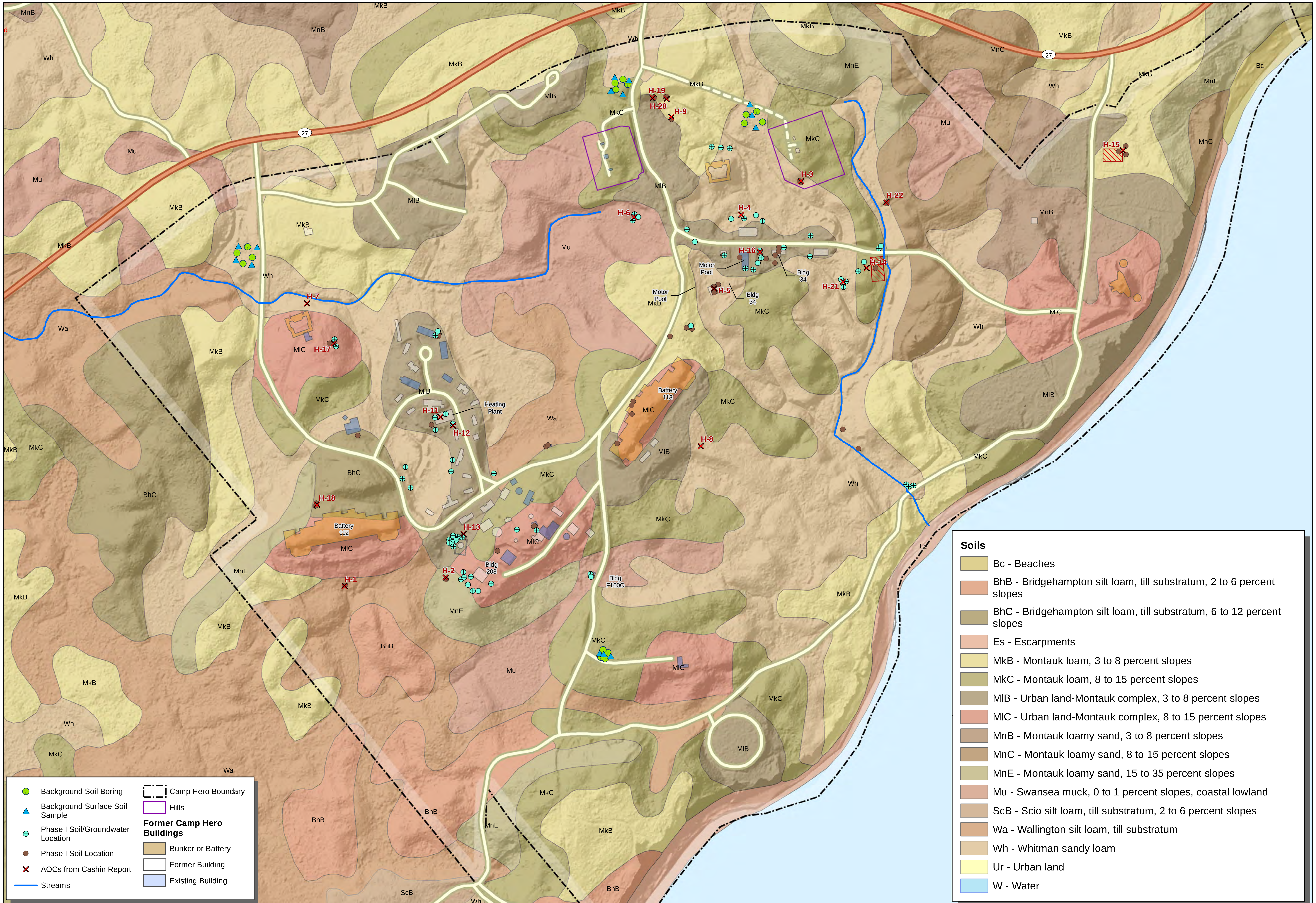

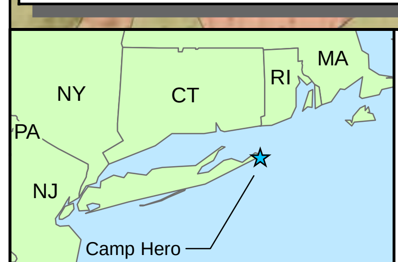

MAP LOCATION

Hillshade Exaggeration = 3x

Surface water features obtained from National Hydrography Dataset (NHD) Dates of publication vary.

SSURGO Soils data obtained from U.S. Department of Agriculture, NRCS Service Center

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 350 700 Feet

1 inch = 350 feet

AECOM

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Soil Survey Site Map with Background Soil Locations

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	March 2017	Figure 1

11/9/2016 1:4,200 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig 3-1 Soils.mxd

MAP LOCATION

N
W E
S

0 25 50
Feet
1 inch = 50 feet

NAD 1983 StatePlane Long Island FIPS 3104

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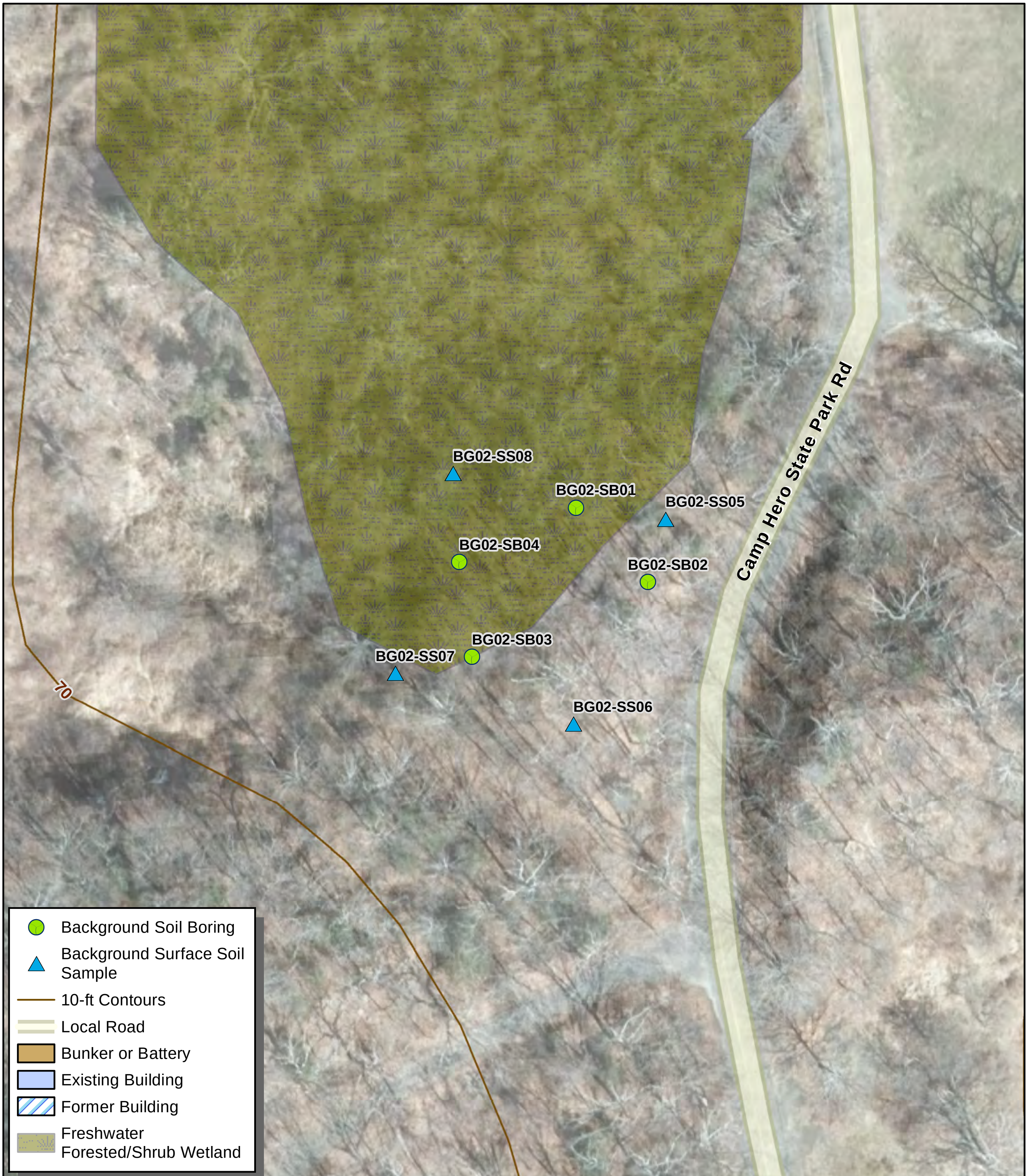
Background Sampling Location 01

Camp Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	March 2017	Figure 2

11/9/2016 1:600 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig 3-2 BG01.mxd (USCHL1FP002\Data\Library\Gisprojects\)



MAP LOCATION

N
W E
S

0 25 50
Feet
1 inch = 50 feet

NAD 1983 StatePlane Long Island FIPS 3104

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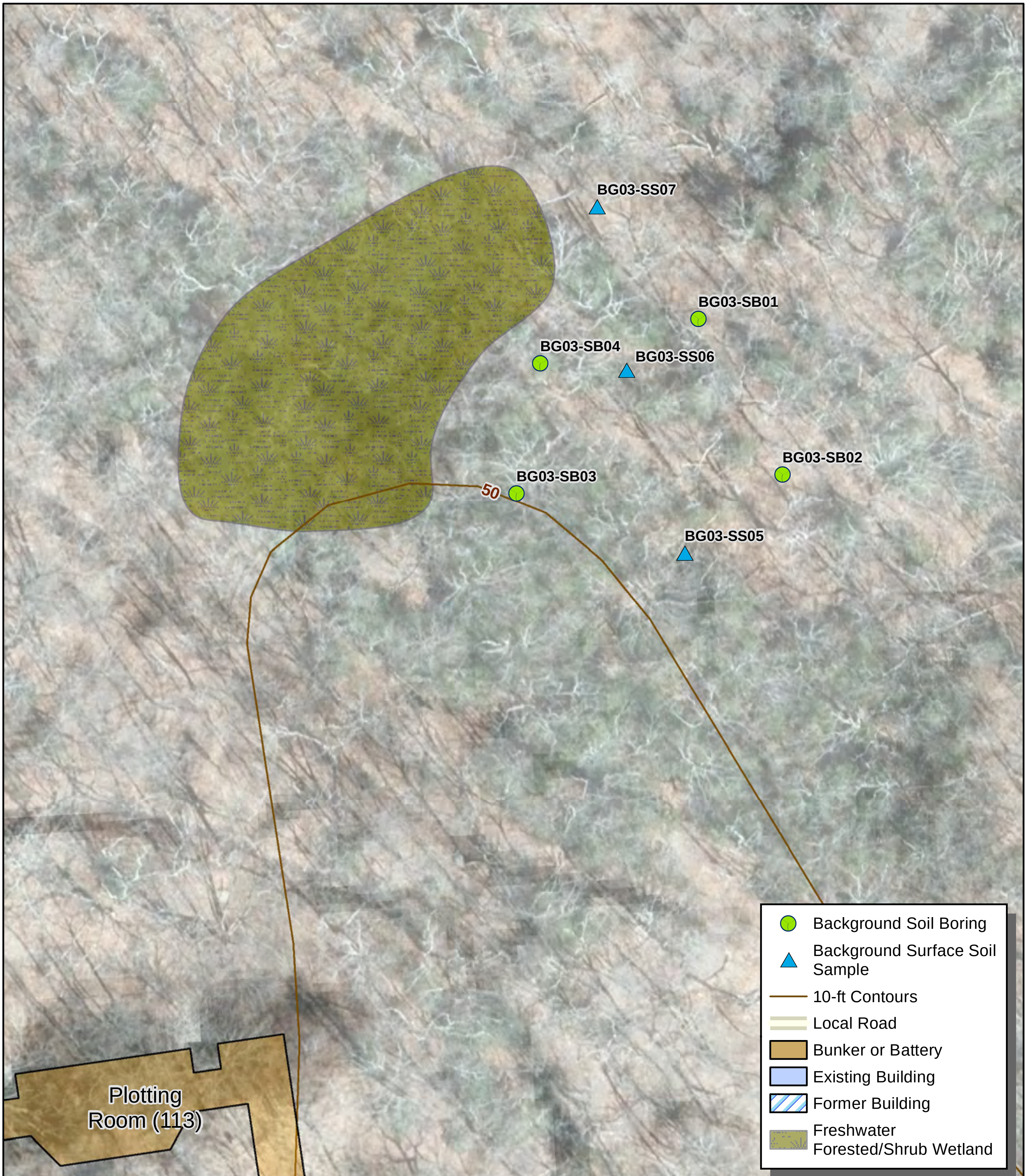
Background Sampling Location 02

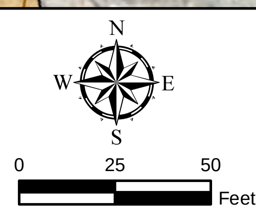
Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	March 2017	**Figure 3**

11/9/2016 1:600 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig 3-3 BG02.mxd (USCHL1FP002\Data\Library\Gisprojects\)



MAP LOCATION



1 inch = 50 feet

NAD 1983 StatePlane Long Island FIPS 3104

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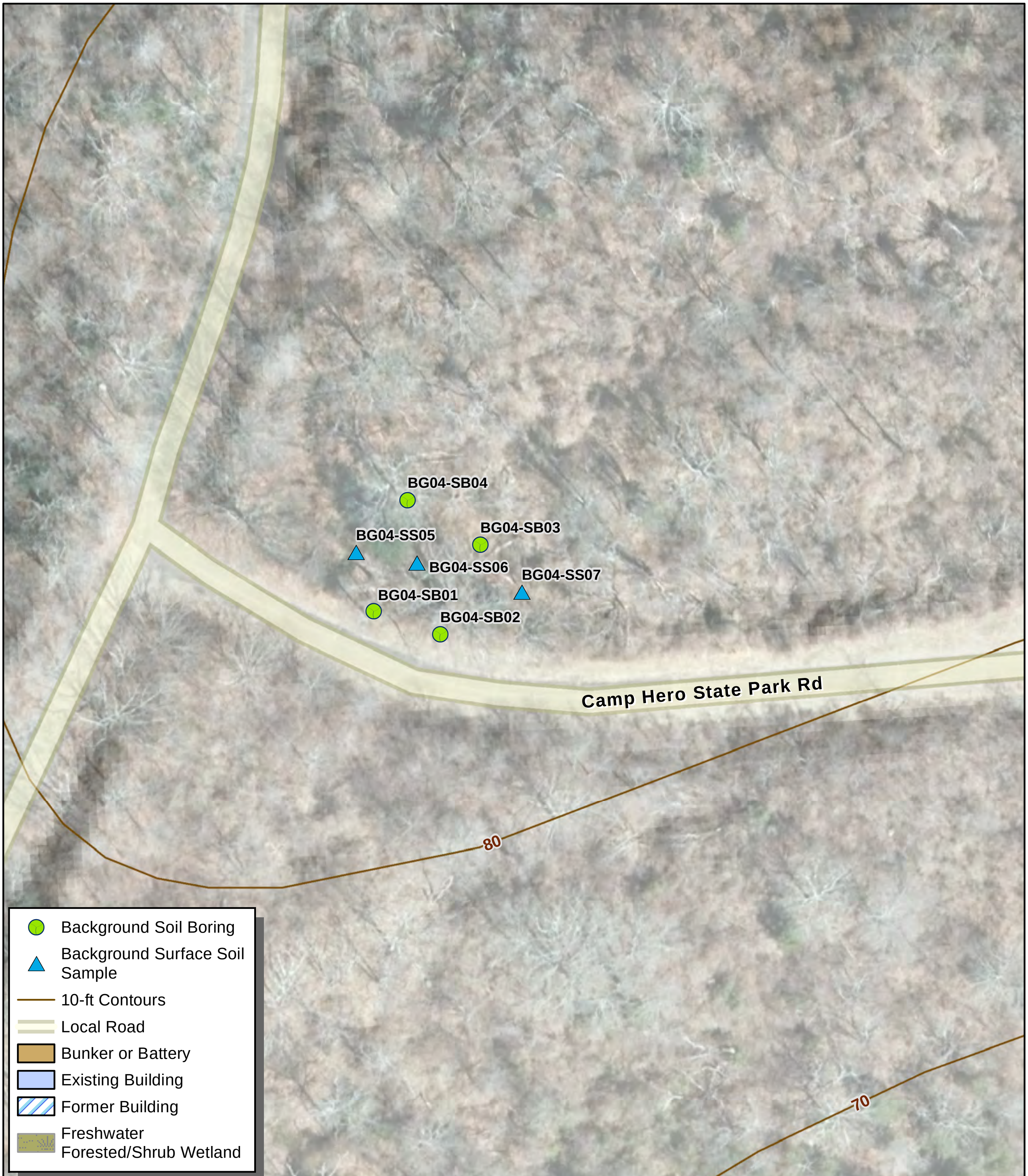
Background Sampling Location 03

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	March 2017	**Figure 4**

11/9/2016 1:600 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig 3-4 BG03.mxd (USCHL1FP002\Data\Library\Gisprojects\)



MAP LOCATION

N
W E
S

0 25 50
Feet
1 inch = 50 feet

NAD 1983 StatePlane Long Island FIPS 3104

AECOM

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Background Sampling Location 04

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	March 2017	**Figure 5**

11/9/2016 1:600 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig 3-5 BG04.mxd (USCHL1FP002\Data\Library\Gisprojects\)

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Attachment C

Background Soil Sample Results

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Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SB01-05	4 - 5 ft	Iron (Fe)	4300	mg/kg	110	24	38		
BG01-SB01-05	4 - 5 ft	Aluminum	5800	mg/kg	380	57	150		
BG01-SB01-05	4 - 5 ft	Lead	2.1	mg/kg	3.8	0.47	0.76	J	J
BG01-SB01-05	4 - 5 ft	Magnesium (Mg)	850	mg/kg	38	2.6	3.8		
BG01-SB01-05	4 - 5 ft	Manganese (Mn)	49	mg/kg	0.76	0.14	0.19		
BG01-SB01-05	4 - 5 ft	Nickel	4.0	mg/kg	3.8	0.21	0.76		
BG01-SB01-05	4 - 5 ft	Potassium (K)	570	mg/kg	15	1.8	7.6		
BG01-SB01-05	4 - 5 ft	Silver	< 0.19	mg/kg	0.76	0.062	0.19		U
BG01-SB01-05	4 - 5 ft	Sodium (Na)	47	mg/kg	38	1.5	3.8		
BG01-SB01-05	4 - 5 ft	Antimony	1.5	mg/kg	0.76	0.28	0.38		
BG01-SB01-05	4 - 5 ft	Arsenic	1.1	mg/kg	1.5	0.55	0.76	J	J
BG01-SB01-05	4 - 5 ft	Barium	17	mg/kg	7.6	0.23	3.8		
BG01-SB01-05	4 - 5 ft	Beryllium	0.058	mg/kg	0.19	0.0096	0.038	J	J
BG01-SB01-05	4 - 5 ft	Cadmium	< 0.038	mg/kg	0.19	0.025	0.038		U
BG01-SB01-05	4 - 5 ft	Chromium	8.2	mg/kg	0.38	0.062	0.30		
BG01-SB01-05	4 - 5 ft	Cobalt	1.5	mg/kg	0.76	0.068	0.19		
BG01-SB01-05	4 - 5 ft	Copper	13	mg/kg	3.8	0.31	0.76		
BG01-SB01-05	4 - 5 ft	Vanadium	13	mg/kg	1.9	0.096	0.76		
BG01-SB01-05	4 - 5 ft	Zinc	8.2	mg/kg	3.8	0.29	0.38		
BG01-SB01-05	4 - 5 ft	Calcium (Ca)	300	mg/kg	38	2.2	7.6		
BG01-SB01-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.88	1.1		U
BG01-SB01-05	4 - 5 ft	Thallium	0.096	mg/kg	0.15	0.036	0.037	J	JG
BG01-SB01-05	4 - 5 ft	Anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		UYQ
BG01-SB01-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Acenaphthylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Chrysene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Benzo(a)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Benzo(a)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Acenaphthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Phenanthrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Fluorene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	1-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	Naphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-05	4 - 5 ft	2-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SB01-06	5 - 6 ft	Iron (Fe)	5600	mg/kg	120	24	39		
BG01-SB01-06	5 - 6 ft	Aluminum	8400	mg/kg	390	58	150		
BG01-SB01-06	5 - 6 ft	Lead	2.4	mg/kg	3.9	0.48	0.77	J	J
BG01-SB01-06	5 - 6 ft	Magnesium (Mg)	1200	mg/kg	39	2.7	3.9		
BG01-SB01-06	5 - 6 ft	Manganese (Mn)	67	mg/kg	0.77	0.14	0.19		
BG01-SB01-06	5 - 6 ft	Nickel	5.9	mg/kg	3.9	0.22	0.77		
BG01-SB01-06	5 - 6 ft	Potassium (K)	760	mg/kg	15	1.8	7.7		
BG01-SB01-06	5 - 6 ft	Silver	< 0.19	mg/kg	0.77	0.063	0.19		U
BG01-SB01-06	5 - 6 ft	Sodium (Na)	65	mg/kg	39	1.6	3.9		
BG01-SB01-06	5 - 6 ft	Antimony	2.1	mg/kg	0.77	0.29	0.39		
BG01-SB01-06	5 - 6 ft	Arsenic	2.0	mg/kg	1.5	0.56	0.77		
BG01-SB01-06	5 - 6 ft	Barium	22	mg/kg	7.7	0.23	3.9		
BG01-SB01-06	5 - 6 ft	Beryllium	0.060	mg/kg	0.19	0.0098	0.039	J	J
BG01-SB01-06	5 - 6 ft	Cadmium	< 0.039	mg/kg	0.19	0.025	0.039		U
BG01-SB01-06	5 - 6 ft	Chromium	11	mg/kg	0.39	0.063	0.31		
BG01-SB01-06	5 - 6 ft	Cobalt	2.1	mg/kg	0.77	0.069	0.19		
BG01-SB01-06	5 - 6 ft	Copper	17	mg/kg	3.9	0.32	0.77		
BG01-SB01-06	5 - 6 ft	Vanadium	16	mg/kg	1.9	0.098	0.77		
BG01-SB01-06	5 - 6 ft	Zinc	12	mg/kg	3.9	0.30	0.39		
BG01-SB01-06	5 - 6 ft	Calcium (Ca)	380	mg/kg	39	2.3	7.7		
BG01-SB01-06	5 - 6 ft	Selenium	< 1.2	mg/kg	1.5	0.90	1.2		U
BG01-SB01-06	5 - 6 ft	Thallium	0.081	mg/kg	0.15	0.035	0.037	J	JG
BG01-SB01-06	5 - 6 ft	Anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	Pyrene	0.0023	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Benzo(g,h,i)perylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UYQ
BG01-SB01-06	5 - 6 ft	Indeno(1,2,3-cd)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	Benzo(b)fluoranthene	0.0016	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Fluoranthene	0.0025	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Benzo(k)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	Acenaphthylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SB01-06	5 - 6 ft	Chrysene	0.0010	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Benzo(a)pyrene	0.00092	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Dibenz(a,h)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	Benzo(a)anthracene	0.0011	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Acenaphthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	Phenanthrene	0.0017	mg/kg	0.00077	0.00077	0.00077		
BG01-SB01-06	5 - 6 ft	Fluorene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	1-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	Naphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB01-06	5 - 6 ft	2-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB02-05	4 - 5 ft	Iron (Fe)	7000	mg/kg	110	23	37	J-	
BG01-SB02-05	4 - 5 ft	Aluminum	10000	mg/kg	370	55	150	J-	
BG01-SB02-05	4 - 5 ft	Lead	3.3	mg/kg	3.7	0.46	0.73	J	J
BG01-SB02-05	4 - 5 ft	Magnesium (Mg)	1700	mg/kg	37	2.6	3.7	J-	X
BG01-SB02-05	4 - 5 ft	Manganese (Mn)	100	mg/kg	0.73	0.14	0.18	J-	X
BG01-SB02-05	4 - 5 ft	Nickel	6.8	mg/kg	3.7	0.21	0.73		
BG01-SB02-05	4 - 5 ft	Potassium (K)	960	mg/kg	15	1.7	7.3		
BG01-SB02-05	4 - 5 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG01-SB02-05	4 - 5 ft	Sodium (Na)	67	mg/kg	37	1.5	3.7		
BG01-SB02-05	4 - 5 ft	Antimony	2.3	mg/kg	0.73	0.28	0.37		
BG01-SB02-05	4 - 5 ft	Arsenic	1.7	mg/kg	1.5	0.53	0.73		
BG01-SB02-05	4 - 5 ft	Barium	25	mg/kg	7.3	0.22	3.7	J-	X
BG01-SB02-05	4 - 5 ft	Beryllium	0.023	mg/kg	0.18	0.0093	0.037	J	J
BG01-SB02-05	4 - 5 ft	Cadmium	< 0.037	mg/kg	0.18	0.024	0.037		U
BG01-SB02-05	4 - 5 ft	Chromium	15	mg/kg	0.37	0.060	0.29	J-	X
BG01-SB02-05	4 - 5 ft	Cobalt	2.3	mg/kg	0.73	0.066	0.18		
BG01-SB02-05	4 - 5 ft	Copper	21	mg/kg	3.7	0.30	0.73		
BG01-SB02-05	4 - 5 ft	Vanadium	19	mg/kg	1.8	0.093	0.73	J-	X
BG01-SB02-05	4 - 5 ft	Zinc	16	mg/kg	3.7	0.28	0.37	J-	X
BG01-SB02-05	4 - 5 ft	Calcium (Ca)	530	mg/kg	37	2.2	7.3	J+	X
BG01-SB02-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG01-SB02-05	4 - 5 ft	Thallium	0.070	mg/kg	0.14	0.035	0.036	J	JG
BG01-SB02-05	4 - 5 ft	Anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UYQ
BG01-SB02-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Acenaphthylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Chrysene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Benzo(a)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Benzo(a)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Acenaphthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Phenanthrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Fluorene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	1-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	Naphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-05	4 - 5 ft	2-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SB02-06	5 - 6 ft	Iron (Fe)	5600	mg/kg	110	23	36		
BG01-SB02-06	5 - 6 ft	Aluminum	7600	mg/kg	360	55	150		
BG01-SB02-06	5 - 6 ft	Lead	2.5	mg/kg	3.6	0.45	0.73	J	J
BG01-SB02-06	5 - 6 ft	Magnesium (Mg)	1400	mg/kg	36	2.5	3.6		
BG01-SB02-06	5 - 6 ft	Manganese (Mn)	98	mg/kg	0.73	0.13	0.18		
BG01-SB02-06	5 - 6 ft	Nickel	5.2	mg/kg	3.6	0.21	0.73		
BG01-SB02-06	5 - 6 ft	Potassium (K)	770	mg/kg	15	1.7	7.3		
BG01-SB02-06	5 - 6 ft	Silver	< 0.18	mg/kg	0.73	0.059	0.18		U
BG01-SB02-06	5 - 6 ft	Sodium (Na)	67	mg/kg	36	1.5	3.6		
BG01-SB02-06	5 - 6 ft	Antimony	1.8	mg/kg	0.73	0.27	0.36		
BG01-SB02-06	5 - 6 ft	Arsenic	0.75	mg/kg	1.5	0.53	0.73	J	J
BG01-SB02-06	5 - 6 ft	Barium	17	mg/kg	7.3	0.22	3.6		
BG01-SB02-06	5 - 6 ft	Beryllium	< 0.036	mg/kg	0.18	0.0092	0.036		U
BG01-SB02-06	5 - 6 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG01-SB02-06	5 - 6 ft	Chromium	11	mg/kg	0.36	0.060	0.29		
BG01-SB02-06	5 - 6 ft	Cobalt	1.8	mg/kg	0.73	0.065	0.18		
BG01-SB02-06	5 - 6 ft	Copper	17	mg/kg	3.6	0.30	0.73		
BG01-SB02-06	5 - 6 ft	Vanadium	13	mg/kg	1.8	0.092	0.73		
BG01-SB02-06	5 - 6 ft	Zinc	13	mg/kg	3.6	0.28	0.36		
BG01-SB02-06	5 - 6 ft	Calcium (Ca)	540	mg/kg	36	2.1	7.3		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SB02-06	5 - 6 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG01-SB02-06	5 - 6 ft	Thallium	0.060	mg/kg	0.16	0.038	0.039	J	JG
BG01-SB02-06	5 - 6 ft	Anthracene	0.00081	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Pyrene	0.0045	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Benzo(g,h,i)perylene	0.0013	mg/kg	0.00076	0.00076	0.00076	J+	YQ
BG01-SB02-06	5 - 6 ft	Indeno(1,2,3-cd)pyrene	0.0011	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Benzo(b)fluoranthene	0.0029	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Fluoranthene	0.0050	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Benzo(k)fluoranthene	0.0012	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB02-06	5 - 6 ft	Chrysene	0.0019	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Benzo(a)pyrene	0.0017	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB02-06	5 - 6 ft	Benzo(a)anthracene	0.0026	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB02-06	5 - 6 ft	Phenanthrene	0.0038	mg/kg	0.00076	0.00076	0.00076		
BG01-SB02-06	5 - 6 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB02-06	5 - 6 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB02-06	5 - 6 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB02-06	5 - 6 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-05	4 - 5 ft	Iron (Fe)	14000	mg/kg	120	25	40		
BG01-SB03-05	4 - 5 ft	Magnesium (Mg)	2400	mg/kg	400	28	40		
BG01-SB03-05	4 - 5 ft	Aluminum	12000	mg/kg	400	60	160		
BG01-SB03-05	4 - 5 ft	Lead	3.7	mg/kg	4.0	0.50	0.80	J	J
BG01-SB03-05	4 - 5 ft	Manganese (Mn)	150	mg/kg	0.80	0.15	0.20		
BG01-SB03-05	4 - 5 ft	Nickel	8.8	mg/kg	4.0	0.23	0.80		
BG01-SB03-05	4 - 5 ft	Potassium (K)	1200	mg/kg	16	1.9	8.0		
BG01-SB03-05	4 - 5 ft	Silver	< 0.20	mg/kg	0.80	0.066	0.20		U
BG01-SB03-05	4 - 5 ft	Sodium (Na)	90	mg/kg	40	1.6	4.0		
BG01-SB03-05	4 - 5 ft	Antimony	3.8	mg/kg	0.80	0.30	0.40		
BG01-SB03-05	4 - 5 ft	Arsenic	2.3	mg/kg	1.6	0.58	0.80		
BG01-SB03-05	4 - 5 ft	Barium	31	mg/kg	8.0	0.24	4.0		
BG01-SB03-05	4 - 5 ft	Beryllium	0.11	mg/kg	0.20	0.010	0.040	J	J
BG01-SB03-05	4 - 5 ft	Cadmium	< 0.040	mg/kg	0.20	0.026	0.040		U
BG01-SB03-05	4 - 5 ft	Chromium	18	mg/kg	0.40	0.066	0.32		
BG01-SB03-05	4 - 5 ft	Cobalt	3.8	mg/kg	0.80	0.072	0.20		
BG01-SB03-05	4 - 5 ft	Copper	36	mg/kg	4.0	0.33	0.80		
BG01-SB03-05	4 - 5 ft	Vanadium	28	mg/kg	2.0	0.10	0.80		
BG01-SB03-05	4 - 5 ft	Zinc	21	mg/kg	4.0	0.31	0.40		
BG01-SB03-05	4 - 5 ft	Calcium (Ca)	730	mg/kg	40	2.4	8.0		
BG01-SB03-05	4 - 5 ft	Selenium	< 1.2	mg/kg	1.6	0.93	1.2		U
BG01-SB03-05	4 - 5 ft	Thallium	0.11	mg/kg	0.16	0.039	0.040	J	JG
BG01-SB03-05	4 - 5 ft	Anthracene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Pyrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		UYQ
BG01-SB03-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Fluoranthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Acenaphthylene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Chrysene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Benzo(a)pyrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Benzo(a)anthracene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Acenaphthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Phenanthrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Fluorene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	1-Methylnaphthalene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	Naphthalene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-05	4 - 5 ft	2-Methylnaphthalene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG01-SB03-08	7 - 8 ft	Iron (Fe)	5200	mg/kg	110	23	37		
BG01-SB03-08	7 - 8 ft	Aluminum	4000	mg/kg	370	56	150		
BG01-SB03-08	7 - 8 ft	Lead	1.8	mg/kg	3.7	0.46	0.74	J	J
BG01-SB03-08	7 - 8 ft	Magnesium (Mg)	730	mg/kg	37	2.6	3.7		
BG01-SB03-08	7 - 8 ft	Manganese (Mn)	64	mg/kg	0.74	0.14	0.19		
BG01-SB03-08	7 - 8 ft	Nickel	2.7	mg/kg	3.7	0.21	0.74	J	J
BG01-SB03-08	7 - 8 ft	Potassium (K)	440	mg/kg	15	1.7	7.4		
BG01-SB03-08	7 - 8 ft	Silver	< 0.19	mg/kg	0.74	0.061	0.19		U
BG01-SB03-08	7 - 8 ft	Sodium (Na)	53	mg/kg	37	1.5	3.7		
BG01-SB03-08	7 - 8 ft	Antimony	1.1	mg/kg	0.74	0.28	0.37		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SB03-08	7 - 8 ft	Arsenic	2.0	mg/kg	1.5	0.54	0.74		
BG01-SB03-08	7 - 8 ft	Barium	10	mg/kg	7.4	0.22	3.7		
BG01-SB03-08	7 - 8 ft	Beryllium	< 0.037	mg/kg	0.19	0.0094	0.037		U
BG01-SB03-08	7 - 8 ft	Cadmium	< 0.037	mg/kg	0.19	0.024	0.037		U
BG01-SB03-08	7 - 8 ft	Chromium	8.5	mg/kg	0.37	0.061	0.30		
BG01-SB03-08	7 - 8 ft	Cobalt	1.1	mg/kg	0.74	0.067	0.19		
BG01-SB03-08	7 - 8 ft	Copper	13	mg/kg	3.7	0.31	0.74		
BG01-SB03-08	7 - 8 ft	Vanadium	19	mg/kg	1.9	0.094	0.74		
BG01-SB03-08	7 - 8 ft	Zinc	7.3	mg/kg	3.7	0.29	0.37		
BG01-SB03-08	7 - 8 ft	Calcium (Ca)	410	mg/kg	37	2.2	7.4		
BG01-SB03-08	7 - 8 ft	Selenium	< 1.1	mg/kg	1.5	0.86	1.1		U
BG01-SB03-08	7 - 8 ft	Thallium	0.066	mg/kg	0.15	0.037	0.038	J	JG
BG01-SB03-08	7 - 8 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Benzo(g,h,i)perylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UYQ
BG01-SB03-08	7 - 8 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Benzo(b)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Chrysene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Benzo(a)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Benzo(a)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Phenanthrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB03-08	7 - 8 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SB04-04	3 - 4 ft	Aluminum	2700	mg/kg	390	59	160		
BG01-SB04-04	3 - 4 ft	Iron (Fe)	1900	mg/kg	12	2.4	3.9		
BG01-SB04-04	3 - 4 ft	Lead	0.61	mg/kg	3.9	0.49	0.78	J	J
BG01-SB04-04	3 - 4 ft	Magnesium (Mg)	320	mg/kg	39	2.7	3.9		
BG01-SB04-04	3 - 4 ft	Manganese (Mn)	25	mg/kg	0.78	0.14	0.20		
BG01-SB04-04	3 - 4 ft	Nickel	1.6	mg/kg	3.9	0.22	0.78	J	J
BG01-SB04-04	3 - 4 ft	Potassium (K)	210	mg/kg	16	1.8	7.8		
BG01-SB04-04	3 - 4 ft	Silver	< 0.20	mg/kg	0.78	0.064	0.20		U
BG01-SB04-04	3 - 4 ft	Sodium (Na)	41	mg/kg	39	1.6	3.9		
BG01-SB04-04	3 - 4 ft	Antimony	0.72	mg/kg	0.78	0.29	0.39	J	J
BG01-SB04-04	3 - 4 ft	Arsenic	< 0.78	mg/kg	1.6	0.57	0.78		U
BG01-SB04-04	3 - 4 ft	Barium	5.3	mg/kg	7.8	0.23	3.9	J	J
BG01-SB04-04	3 - 4 ft	Beryllium	0.032	mg/kg	0.20	0.0099	0.039	J	J
BG01-SB04-04	3 - 4 ft	Cadmium	< 0.039	mg/kg	0.20	0.026	0.039		U
BG01-SB04-04	3 - 4 ft	Chromium	3.2	mg/kg	0.39	0.065	0.31		
BG01-SB04-04	3 - 4 ft	Cobalt	0.70	mg/kg	0.78	0.071	0.20	J	J
BG01-SB04-04	3 - 4 ft	Copper	5.4	mg/kg	3.9	0.33	0.78		
BG01-SB04-04	3 - 4 ft	Vanadium	4.1	mg/kg	2.0	0.099	0.78		
BG01-SB04-04	3 - 4 ft	Zinc	3.0	mg/kg	3.9	0.30	0.39	J	J
BG01-SB04-04	3 - 4 ft	Calcium (Ca)	170	mg/kg	39	2.3	7.8		
BG01-SB04-04	3 - 4 ft	Selenium	< 1.2	mg/kg	1.6	0.91	1.2		U
BG01-SB04-04	3 - 4 ft	Thallium	< 0.039	mg/kg	0.16	0.038	0.039		U
BG01-SB04-04	3 - 4 ft	Anthracene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Pyrene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Benzo(g,h,i)perylene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		UYQ
BG01-SB04-04	3 - 4 ft	Indeno(1,2,3-cd)pyrene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Benzo(b)fluoranthene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Fluoranthene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Benzo(k)fluoranthene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Acenaphthylene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Chrysene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Benzo(a)pyrene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Dibenz(a,h)anthracene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Benzo(a)anthracene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Acenaphthene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Phenanthrene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Fluorene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	1-Methylnaphthalene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	Naphthalene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U
BG01-SB04-04	3 - 4 ft	2-Methylnaphthalene	< 0.00082	mg/kg	0.00082	0.00082	0.00082		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SB04-05	4 - 5 ft	Iron (Fe)	3800	mg/kg	120	24	39		
BG01-SB04-05	4 - 5 ft	Aluminum	6000	mg/kg	390	58	160		
BG01-SB04-05	4 - 5 ft	Lead	1.5	mg/kg	3.9	0.48	0.78	J	J
BG01-SB04-05	4 - 5 ft	Magnesium (Mg)	990	mg/kg	39	2.7	3.9		
BG01-SB04-05	4 - 5 ft	Manganese (Mn)	48	mg/kg	0.78	0.14	0.19		
BG01-SB04-05	4 - 5 ft	Nickel	4.6	mg/kg	3.9	0.22	0.78		
BG01-SB04-05	4 - 5 ft	Potassium (K)	550	mg/kg	16	1.8	7.8		
BG01-SB04-05	4 - 5 ft	Silver	< 0.19	mg/kg	0.78	0.064	0.19		U
BG01-SB04-05	4 - 5 ft	Sodium (Na)	55	mg/kg	39	1.6	3.9		
BG01-SB04-05	4 - 5 ft	Antimony	1.7	mg/kg	0.78	0.29	0.39		
BG01-SB04-05	4 - 5 ft	Arsenic	0.82	mg/kg	1.6	0.56	0.78	J	J
BG01-SB04-05	4 - 5 ft	Barium	18	mg/kg	7.8	0.23	3.9		
BG01-SB04-05	4 - 5 ft	Beryllium	0.031	mg/kg	0.19	0.0099	0.039	J	J
BG01-SB04-05	4 - 5 ft	Cadmium	< 0.039	mg/kg	0.19	0.026	0.039		U
BG01-SB04-05	4 - 5 ft	Chromium	10	mg/kg	0.39	0.064	0.31		
BG01-SB04-05	4 - 5 ft	Cobalt	1.7	mg/kg	0.78	0.070	0.19		
BG01-SB04-05	4 - 5 ft	Copper	11	mg/kg	3.9	0.32	0.78		
BG01-SB04-05	4 - 5 ft	Vanadium	9.1	mg/kg	1.9	0.099	0.78		
BG01-SB04-05	4 - 5 ft	Zinc	8.9	mg/kg	3.9	0.30	0.39		
BG01-SB04-05	4 - 5 ft	Calcium (Ca)	300	mg/kg	39	2.3	7.8		
BG01-SB04-05	4 - 5 ft	Selenium	< 1.2	mg/kg	1.6	0.90	1.2		U
BG01-SB04-05	4 - 5 ft	Thallium	0.17	mg/kg	0.16	0.038	0.039	J	
BG01-SB04-05	4 - 5 ft	Anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		UYQ
BG01-SB04-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Acenaphthylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Chrysene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Benzo(a)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Benzo(a)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Acenaphthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Phenanthrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Fluorene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	1-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	Naphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05	4 - 5 ft	2-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG01-SB04-05 DUP	4 - 5 ft	Iron (Fe)	3000	mg/kg	110	24	38		
BG01-SB04-05 DUP	4 - 5 ft	Aluminum	4700	mg/kg	380	57	150		
BG01-SB04-05 DUP	4 - 5 ft	Lead	1.5	mg/kg	3.8	0.48	0.76	J	J
BG01-SB04-05 DUP	4 - 5 ft	Magnesium (Mg)	750	mg/kg	38	2.7	3.8		
BG01-SB04-05 DUP	4 - 5 ft	Manganese (Mn)	38	mg/kg	0.76	0.14	0.19		
BG01-SB04-05 DUP	4 - 5 ft	Nickel	3.6	mg/kg	3.8	0.22	0.76	J	J
BG01-SB04-05 DUP	4 - 5 ft	Potassium (K)	420	mg/kg	15	1.8	7.6		
BG01-SB04-05 DUP	4 - 5 ft	Silver	< 0.19	mg/kg	0.76	0.063	0.19		U
BG01-SB04-05 DUP	4 - 5 ft	Sodium (Na)	50	mg/kg	38	1.6	3.8		
BG01-SB04-05 DUP	4 - 5 ft	Antimony	1.4	mg/kg	0.76	0.29	0.38		
BG01-SB04-05 DUP	4 - 5 ft	Arsenic	0.85	mg/kg	1.5	0.55	0.76	J	J
BG01-SB04-05 DUP	4 - 5 ft	Barium	12	mg/kg	7.6	0.23	3.8		
BG01-SB04-05 DUP	4 - 5 ft	Beryllium	0.029	mg/kg	0.19	0.0097	0.038	J	J
BG01-SB04-05 DUP	4 - 5 ft	Cadmium	< 0.038	mg/kg	0.19	0.025	0.038		U
BG01-SB04-05 DUP	4 - 5 ft	Chromium	7.2	mg/kg	0.38	0.063	0.31		
BG01-SB04-05 DUP	4 - 5 ft	Cobalt	1.3	mg/kg	0.76	0.069	0.19		
BG01-SB04-05 DUP	4 - 5 ft	Copper	9.3	mg/kg	3.8	0.32	0.76		
BG01-SB04-05 DUP	4 - 5 ft	Vanadium	7.1	mg/kg	1.9	0.097	0.76		
BG01-SB04-05 DUP	4 - 5 ft	Zinc	6.9	mg/kg	3.8	0.30	0.38		
BG01-SB04-05 DUP	4 - 5 ft	Calcium (Ca)	270	mg/kg	38	2.2	7.6		
BG01-SB04-05 DUP	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.89	1.1		U
BG01-SB04-05 DUP	4 - 5 ft	Thallium	0.089	mg/kg	0.15	0.037	0.038	J	J
BG01-SB04-05 DUP	4 - 5 ft	Anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UYQ
BG01-SB04-05 DUP	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Benzo(b)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Benzo(k)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Acenaphthylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SB04-05 DUP	4 - 5 ft	Chrysene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Benzo(a)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Benzo(a)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Acenaphthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Phenanthrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Fluorene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	1-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	Naphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SB04-05 DUP	4 - 5 ft	2-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG01-SS01-01	0 - 1 ft	Iron (Fe)	5000	mg/kg	110	23	37		
BG01-SS01-01	0 - 1 ft	Aluminum	8500	mg/kg	370	55	150		
BG01-SS01-01	0 - 1 ft	Lead	5.5	mg/kg	3.7	0.46	0.74		
BG01-SS01-01	0 - 1 ft	Magnesium (Mg)	450	mg/kg	37	2.6	3.7		
BG01-SS01-01	0 - 1 ft	Manganese (Mn)	37	mg/kg	0.74	0.14	0.18		
BG01-SS01-01	0 - 1 ft	Nickel	4.7	mg/kg	3.7	0.21	0.74		
BG01-SS01-01	0 - 1 ft	Potassium (K)	270	mg/kg	15	1.7	7.4		
BG01-SS01-01	0 - 1 ft	Silver	0.066	mg/kg	0.74	0.060	0.18	J	J
BG01-SS01-01	0 - 1 ft	Sodium (Na)	51	mg/kg	37	1.5	3.7		
BG01-SS01-01	0 - 1 ft	Antimony	1.4	mg/kg	0.74	0.28	0.37		
BG01-SS01-01	0 - 1 ft	Arsenic	0.88	mg/kg	1.5	0.53	0.74	J	J
BG01-SS01-01	0 - 1 ft	Barium	13	mg/kg	7.4	0.22	3.7		
BG01-SS01-01	0 - 1 ft	Beryllium	0.25	mg/kg	0.18	0.0093	0.037		
BG01-SS01-01	0 - 1 ft	Cadmium	0.20	mg/kg	0.18	0.024	0.037		
BG01-SS01-01	0 - 1 ft	Chromium	7.6	mg/kg	0.37	0.061	0.29		
BG01-SS01-01	0 - 1 ft	Cobalt	1.4	mg/kg	0.74	0.066	0.18		
BG01-SS01-01	0 - 1 ft	Copper	12	mg/kg	3.7	0.31	0.74		
BG01-SS01-01	0 - 1 ft	Vanadium	9.6	mg/kg	1.8	0.093	0.74		
BG01-SS01-01	0 - 1 ft	Zinc	17	mg/kg	3.7	0.28	0.37		
BG01-SS01-01	0 - 1 ft	Calcium (Ca)	240	mg/kg	37	2.2	7.4		
BG01-SS01-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.86	1.1		U
BG01-SS01-01	0 - 1 ft	Thallium	0.066	mg/kg	0.14	0.035	0.036	J	JG
BG01-SS01-01	0 - 1 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Pyrene	0.0024	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Benzo(g,h,i)perylene	0.00079	mg/kg	0.00076	0.00076	0.00076	J+	YQ
BG01-SS01-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Benzo(b)fluoranthene	0.0020	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Fluoranthene	0.0026	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Chrysene	0.00095	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Benzo(a)pyrene	0.00094	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Benzo(a)anthracene	0.0014	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Phenanthrene	0.0020	mg/kg	0.00076	0.00076	0.00076		
BG01-SS01-01	0 - 1 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS01-01	0 - 1 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS02-01	0 - 1 ft	Iron (Fe)	5000	mg/kg	110	23	36		
BG01-SS02-01	0 - 1 ft	Aluminum	9600	mg/kg	360	55	150		
BG01-SS02-01	0 - 1 ft	Lead	3.1	mg/kg	3.6	0.45	0.73	J	J
BG01-SS02-01	0 - 1 ft	Magnesium (Mg)	550	mg/kg	36	2.6	3.6		
BG01-SS02-01	0 - 1 ft	Manganese (Mn)	49	mg/kg	0.73	0.13	0.18		
BG01-SS02-01	0 - 1 ft	Nickel	3.8	mg/kg	3.6	0.21	0.73		
BG01-SS02-01	0 - 1 ft	Potassium (K)	270	mg/kg	15	1.7	7.3		
BG01-SS02-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG01-SS02-01	0 - 1 ft	Sodium (Na)	45	mg/kg	36	1.5	3.6		
BG01-SS02-01	0 - 1 ft	Antimony	1.1	mg/kg	0.73	0.27	0.36		
BG01-SS02-01	0 - 1 ft	Arsenic	1.4	mg/kg	1.5	0.53	0.73	J	J
BG01-SS02-01	0 - 1 ft	Barium	16	mg/kg	7.3	0.22	3.6		
BG01-SS02-01	0 - 1 ft	Beryllium	0.055	mg/kg	0.18	0.0092	0.036	J	J
BG01-SS02-01	0 - 1 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG01-SS02-01	0 - 1 ft	Chromium	7.6	mg/kg	0.36	0.060	0.29		
BG01-SS02-01	0 - 1 ft	Cobalt	1.0	mg/kg	0.73	0.066	0.18		
BG01-SS02-01	0 - 1 ft	Copper	12	mg/kg	3.6	0.30	0.73		
BG01-SS02-01	0 - 1 ft	Vanadium	10	mg/kg	1.8	0.093	0.73		
BG01-SS02-01	0 - 1 ft	Zinc	13	mg/kg	3.6	0.28	0.36		
BG01-SS02-01	0 - 1 ft	Calcium (Ca)	280	mg/kg	36	2.1	7.3		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SS02-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG01-SS02-01	0 - 1 ft	Thallium	0.062	mg/kg	0.15	0.036	0.037	J	JG
BG01-SS02-01	0 - 1 ft	Anthracene	0.00076	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Pyrene	0.0093	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0032	mg/kg	0.00075	0.00075	0.00075	J+	YQ
BG01-SS02-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0027	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Benzo(b)fluoranthene	0.0083	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Fluoranthene	0.0099	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Benzo(k)fluoranthene	0.0021	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Acenaphthylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS02-01	0 - 1 ft	Chrysene	0.0039	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Benzo(a)pyrene	0.0044	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS02-01	0 - 1 ft	Benzo(a)anthracene	0.0048	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Acenaphthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS02-01	0 - 1 ft	Phenanthrene	0.0052	mg/kg	0.00075	0.00075	0.00075		
BG01-SS02-01	0 - 1 ft	Fluorene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS02-01	0 - 1 ft	1-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS02-01	0 - 1 ft	Naphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS02-01	0 - 1 ft	2-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS03-01	0 - 1 ft	Iron (Fe)	6700	mg/kg	110	23	36		
BG01-SS03-01	0 - 1 ft	Aluminum	7600	mg/kg	360	55	150		
BG01-SS03-01	0 - 1 ft	Lead	3.3	mg/kg	3.6	0.45	0.73	J	J
BG01-SS03-01	0 - 1 ft	Magnesium (Mg)	680	mg/kg	36	2.5	3.6		
BG01-SS03-01	0 - 1 ft	Manganese (Mn)	57	mg/kg	0.73	0.13	0.18		
BG01-SS03-01	0 - 1 ft	Nickel	3.6	mg/kg	3.6	0.21	0.73		J
BG01-SS03-01	0 - 1 ft	Potassium (K)	240	mg/kg	15	1.7	7.3		
BG01-SS03-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG01-SS03-01	0 - 1 ft	Sodium (Na)	47	mg/kg	36	1.5	3.6		
BG01-SS03-01	0 - 1 ft	Antimony	1.3	mg/kg	0.73	0.27	0.36		
BG01-SS03-01	0 - 1 ft	Arsenic	1.0	mg/kg	1.5	0.53	0.73	J	J
BG01-SS03-01	0 - 1 ft	Barium	14	mg/kg	7.3	0.22	3.6		
BG01-SS03-01	0 - 1 ft	Beryllium	0.11	mg/kg	0.18	0.0092	0.036	J	J
BG01-SS03-01	0 - 1 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG01-SS03-01	0 - 1 ft	Chromium	7.9	mg/kg	0.36	0.060	0.29		
BG01-SS03-01	0 - 1 ft	Cobalt	1.3	mg/kg	0.73	0.065	0.18		
BG01-SS03-01	0 - 1 ft	Copper	16	mg/kg	3.6	0.30	0.73		
BG01-SS03-01	0 - 1 ft	Vanadium	11	mg/kg	1.8	0.092	0.73		
BG01-SS03-01	0 - 1 ft	Zinc	9.9	mg/kg	3.6	0.28	0.36		
BG01-SS03-01	0 - 1 ft	Calcium (Ca)	250	mg/kg	36	2.1	7.3		
BG01-SS03-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG01-SS03-01	0 - 1 ft	Thallium	0.062	mg/kg	0.15	0.035	0.036	J	JG
BG01-SS03-01	0 - 1 ft	Anthracene	0.0014	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Pyrene	0.024	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0074	mg/kg	0.00074	0.00074	0.00074	J+	YQ
BG01-SS03-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0063	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Benzo(b)fluoranthene	0.024	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Fluoranthene	0.025	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Benzo(k)fluoranthene	0.0048	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Acenaphthylene	0.0010	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Chrysene	0.010	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Benzo(a)pyrene	0.011	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG01-SS03-01	0 - 1 ft	Benzo(a)anthracene	0.014	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Acenaphthene	0.00082	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Phenanthrene	0.016	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	Fluorene	0.0011	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	1-Methylnaphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG01-SS03-01	0 - 1 ft	Naphthalene	0.00080	mg/kg	0.00074	0.00074	0.00074		
BG01-SS03-01	0 - 1 ft	2-Methylnaphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG01-SS04-01	0 - 1 ft	Iron (Fe)	5700	mg/kg	110	22	36		
BG01-SS04-01	0 - 1 ft	Aluminum	9500	mg/kg	360	54	140		
BG01-SS04-01	0 - 1 ft	Lead	3.8	mg/kg	3.6	0.45	0.72		
BG01-SS04-01	0 - 1 ft	Magnesium (Mg)	540	mg/kg	36	2.5	3.6		
BG01-SS04-01	0 - 1 ft	Manganese (Mn)	39	mg/kg	0.72	0.13	0.18		
BG01-SS04-01	0 - 1 ft	Nickel	4.4	mg/kg	3.6	0.20	0.72		
BG01-SS04-01	0 - 1 ft	Potassium (K)	270	mg/kg	14	1.7	7.2		
BG01-SS04-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG01-SS04-01	0 - 1 ft	Sodium (Na)	42	mg/kg	36	1.5	3.6		
BG01-SS04-01	0 - 1 ft	Antimony	1.1	mg/kg	0.72	0.27	0.36		

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SS04-01	0 - 1 ft	Arsenic	1.2	mg/kg	1.4	0.52	0.72	J	J
BG01-SS04-01	0 - 1 ft	Barium	17	mg/kg	7.2	0.21	3.6		
BG01-SS04-01	0 - 1 ft	Beryllium	0.063	mg/kg	0.18	0.0091	0.036	J	J
BG01-SS04-01	0 - 1 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG01-SS04-01	0 - 1 ft	Chromium	7.9	mg/kg	0.36	0.059	0.29		
BG01-SS04-01	0 - 1 ft	Cobalt	1.1	mg/kg	0.72	0.065	0.18		
BG01-SS04-01	0 - 1 ft	Copper	14	mg/kg	3.6	0.30	0.72		
BG01-SS04-01	0 - 1 ft	Vanadium	11	mg/kg	1.8	0.091	0.72		
BG01-SS04-01	0 - 1 ft	Zinc	14	mg/kg	3.6	0.28	0.36		
BG01-SS04-01	0 - 1 ft	Calcium (Ca)	220	mg/kg	36	2.1	7.2		
BG01-SS04-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG01-SS04-01	0 - 1 ft	Thallium	0.061	mg/kg	0.15	0.037	0.038	J	JG
BG01-SS04-01	0 - 1 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Pyrene	0.0017	mg/kg	0.00076	0.00076	0.00076		
BG01-SS04-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UYQ
BG01-SS04-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Benzo(b)fluoranthene	0.0018	mg/kg	0.00076	0.00076	0.00076		
BG01-SS04-01	0 - 1 ft	Fluoranthene	0.0017	mg/kg	0.00076	0.00076	0.00076		
BG01-SS04-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Chrysene	0.00086	mg/kg	0.00076	0.00076	0.00076		
BG01-SS04-01	0 - 1 ft	Benzo(a)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Benzo(a)anthracene	0.00094	mg/kg	0.00076	0.00076	0.00076		
BG01-SS04-01	0 - 1 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Phenanthrene	0.0013	mg/kg	0.00076	0.00076	0.00076		
BG01-SS04-01	0 - 1 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS04-01	0 - 1 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS05-01	0 - 1 ft	Iron (Fe)	5800	mg/kg	130	27	43		
BG01-SS05-01	0 - 1 ft	Aluminum	8400	mg/kg	430	64	170		
BG01-SS05-01	0 - 1 ft	Lead	11	mg/kg	4.3	0.53	0.85		
BG01-SS05-01	0 - 1 ft	Magnesium (Mg)	600	mg/kg	43	3.0	4.3		
BG01-SS05-01	0 - 1 ft	Manganese (Mn)	50	mg/kg	0.85	0.16	0.21		
BG01-SS05-01	0 - 1 ft	Nickel	4.2	mg/kg	4.3	0.24	0.85	J	J
BG01-SS05-01	0 - 1 ft	Silver	< 0.21	mg/kg	0.85	0.070	0.21		U
BG01-SS05-01	0 - 1 ft	Sodium (Na)	62	mg/kg	43	1.7	4.3		
BG01-SS05-01	0 - 1 ft	Antimony	1.1	mg/kg	0.85	0.32	0.43		
BG01-SS05-01	0 - 1 ft	Arsenic	1.3	mg/kg	1.7	0.62	0.85	J	J
BG01-SS05-01	0 - 1 ft	Barium	17	mg/kg	8.5	0.25	4.3		
BG01-SS05-01	0 - 1 ft	Beryllium	0.093	mg/kg	0.21	0.011	0.043	J	J
BG01-SS05-01	0 - 1 ft	Cadmium	0.047	mg/kg	0.21	0.028	0.043	J	J
BG01-SS05-01	0 - 1 ft	Chromium	8.3	mg/kg	0.43	0.070	0.34		
BG01-SS05-01	0 - 1 ft	Cobalt	1.2	mg/kg	0.85	0.076	0.21		
BG01-SS05-01	0 - 1 ft	Copper	14	mg/kg	4.3	0.35	0.85		
BG01-SS05-01	0 - 1 ft	Vanadium	13	mg/kg	2.1	0.11	0.85		
BG01-SS05-01	0 - 1 ft	Zinc	12	mg/kg	4.3	0.33	0.43		
BG01-SS05-01	0 - 1 ft	Calcium (Ca)	270	mg/kg	43	2.5	8.5		
BG01-SS05-01	0 - 1 ft	Selenium	< 1.3	mg/kg	1.7	0.99	1.3		U
BG01-SS05-01	0 - 1 ft	Potassium (K)	340	mg/kg	17	2.0	8.5		
BG01-SS05-01	0 - 1 ft	Thallium	0.14	mg/kg	0.17	0.042	0.043	J	J
BG01-SS05-01	0 - 1 ft	Anthracene	0.057	mg/kg	0.0026	0.0026	0.0026		
BG01-SS05-01	0 - 1 ft	Benzo(g,h,i)perylene	0.082	mg/kg	0.0026	0.0026	0.0026	J+	
BG01-SS05-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.36	mg/kg	0.017	0.017	0.017		
BG01-SS05-01	0 - 1 ft	Benzo(k)fluoranthene	0.44	mg/kg	0.017	0.017	0.017		
BG01-SS05-01	0 - 1 ft	Benzo(a)pyrene	0.53	mg/kg	0.017	0.017	0.017		
BG01-SS05-01	0 - 1 ft	Pyrene	0.43	mg/kg	0.043	0.043	0.043	J-	H
BG01-SS05-01	0 - 1 ft	Benzo(b)fluoranthene	0.30	mg/kg	0.043	0.043	0.043	J-	H
BG01-SS05-01	0 - 1 ft	Fluoranthene	0.57	mg/kg	0.043	0.043	0.043	J-	H
BG01-SS05-01	0 - 1 ft	Chrysene	0.20	mg/kg	0.043	0.043	0.043	J-	H
BG01-SS05-01	0 - 1 ft	Benzo(a)anthracene	0.20	mg/kg	0.043	0.043	0.043	J-	H
BG01-SS05-01	0 - 1 ft	Phenanthrene	0.31	mg/kg	0.043	0.043	0.043	J-	H
BG01-SS05-01	0 - 1 ft	Acenaphthylene	0.012	mg/kg	0.00086	0.00086	0.00086		
BG01-SS05-01	0 - 1 ft	Dibenz(a,h)anthracene	0.021	mg/kg	0.00086	0.00086	0.00086		
BG01-SS05-01	0 - 1 ft	Acenaphthene	0.024	mg/kg	0.00086	0.00086	0.00086		
BG01-SS05-01	0 - 1 ft	Fluorene	0.030	mg/kg	0.00086	0.00086	0.00086		
BG01-SS05-01	0 - 1 ft	1-Methylnaphthalene	0.0059	mg/kg	0.00086	0.00086	0.00086		
BG01-SS05-01	0 - 1 ft	Naphthalene	0.0057	mg/kg	0.00086	0.00086	0.00086		
BG01-SS05-01	0 - 1 ft	2-Methylnaphthalene	0.0052	mg/kg	0.00086	0.00086	0.00086		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SS06-01	0 - 1 ft	Iron (Fe)	4700	mg/kg	110	23	37		
BG01-SS06-01	0 - 1 ft	Aluminum	5200	mg/kg	370	55	150		
BG01-SS06-01	0 - 1 ft	Lead	9.8	mg/kg	3.7	0.45	0.73		
BG01-SS06-01	0 - 1 ft	Magnesium (Mg)	290	mg/kg	37	2.6	3.7		
BG01-SS06-01	0 - 1 ft	Manganese (Mn)	44	mg/kg	0.73	0.13	0.18		
BG01-SS06-01	0 - 1 ft	Nickel	7.2	mg/kg	3.7	0.21	0.73		
BG01-SS06-01	0 - 1 ft	Silver	3.8	mg/kg	0.73	0.060	0.18		
BG01-SS06-01	0 - 1 ft	Sodium (Na)	63	mg/kg	37	1.5	3.7		
BG01-SS06-01	0 - 1 ft	Antimony	5.3	mg/kg	0.73	0.27	0.37		
BG01-SS06-01	0 - 1 ft	Arsenic	2.8	mg/kg	1.5	0.53	0.73		
BG01-SS06-01	0 - 1 ft	Barium	14	mg/kg	7.3	0.22	3.7		
BG01-SS06-01	0 - 1 ft	Beryllium	4.9	mg/kg	0.18	0.0093	0.037		
BG01-SS06-01	0 - 1 ft	Cadmium	4.1	mg/kg	0.18	0.024	0.037		
BG01-SS06-01	0 - 1 ft	Chromium	9.7	mg/kg	0.37	0.060	0.29		
BG01-SS06-01	0 - 1 ft	Cobalt	5.5	mg/kg	0.73	0.066	0.18		
BG01-SS06-01	0 - 1 ft	Copper	17	mg/kg	3.7	0.30	0.73		
BG01-SS06-01	0 - 1 ft	Vanadium	13	mg/kg	1.8	0.093	0.73		
BG01-SS06-01	0 - 1 ft	Zinc	25	mg/kg	3.7	0.28	0.37		
BG01-SS06-01	0 - 1 ft	Calcium (Ca)	270	mg/kg	37	2.1	7.3		
BG01-SS06-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG01-SS06-01	0 - 1 ft	Potassium (K)	170	mg/kg	15	1.7	7.3		
BG01-SS06-01	0 - 1 ft	Thallium	0.13	mg/kg	0.14	0.034	0.035	J	J
BG01-SS06-01	0 - 1 ft	Anthracene	0.0011	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Pyrene	0.012	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0030	mg/kg	0.00075	0.00075	0.00075	J+	YQ
BG01-SS06-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0025	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Benzo(b)fluoranthene	0.011	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Fluoranthene	0.013	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Benzo(k)fluoranthene	0.0031	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Acenaphthylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS06-01	0 - 1 ft	Chrysene	0.0051	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Benzo(a)pyrene	0.0054	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS06-01	0 - 1 ft	Benzo(a)anthracene	0.0067	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Acenaphthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS06-01	0 - 1 ft	Phenanthrene	0.0090	mg/kg	0.00075	0.00075	0.00075		
BG01-SS06-01	0 - 1 ft	Fluorene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS06-01	0 - 1 ft	1-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS06-01	0 - 1 ft	Naphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS06-01	0 - 1 ft	2-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG01-SS07-01	0 - 1 ft	Iron (Fe)	5700	mg/kg	110	23	36		
BG01-SS07-01	0 - 1 ft	Aluminum	6100	mg/kg	360	54	140		
BG01-SS07-01	0 - 1 ft	Lead	3.2	mg/kg	3.6	0.45	0.72	J	J
BG01-SS07-01	0 - 1 ft	Magnesium (Mg)	500	mg/kg	36	2.5	3.6		
BG01-SS07-01	0 - 1 ft	Manganese (Mn)	45	mg/kg	0.72	0.13	0.18		
BG01-SS07-01	0 - 1 ft	Nickel	2.9	mg/kg	3.6	0.20	0.72	J	J
BG01-SS07-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG01-SS07-01	0 - 1 ft	Sodium (Na)	46	mg/kg	36	1.5	3.6		
BG01-SS07-01	0 - 1 ft	Antimony	0.90	mg/kg	0.72	0.27	0.36		
BG01-SS07-01	0 - 1 ft	Arsenic	0.70	mg/kg	1.4	0.52	0.72	J	J
BG01-SS07-01	0 - 1 ft	Barium	10	mg/kg	7.2	0.21	3.6		
BG01-SS07-01	0 - 1 ft	Beryllium	0.17	mg/kg	0.18	0.0091	0.036	J	J
BG01-SS07-01	0 - 1 ft	Cadmium	0.032	mg/kg	0.18	0.024	0.036	J	J
BG01-SS07-01	0 - 1 ft	Chromium	6.3	mg/kg	0.36	0.059	0.29		
BG01-SS07-01	0 - 1 ft	Cobalt	1.0	mg/kg	0.72	0.065	0.18		
BG01-SS07-01	0 - 1 ft	Copper	14	mg/kg	3.6	0.30	0.72		
BG01-SS07-01	0 - 1 ft	Vanadium	9.0	mg/kg	1.8	0.091	0.72		
BG01-SS07-01	0 - 1 ft	Zinc	6.9	mg/kg	3.6	0.28	0.36		
BG01-SS07-01	0 - 1 ft	Calcium (Ca)	240	mg/kg	36	2.1	7.2		
BG01-SS07-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG01-SS07-01	0 - 1 ft	Potassium (K)	220	mg/kg	14	1.7	7.2		
BG01-SS07-01	0 - 1 ft	Thallium	0.091	mg/kg	0.15	0.036	0.037	J	J
BG01-SS07-01	0 - 1 ft	Anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	Pyrene	0.0019	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073	UJ	UYQ
BG01-SS07-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	Benzo(b)fluoranthene	0.0021	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Fluoranthene	0.0019	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	Acenaphthylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SS07-01	0 - 1 ft	Chrysene	0.00084	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Benzo(a)pyrene	0.00082	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	Benzo(a)anthracene	0.0013	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Acenaphthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	Phenanthrene	0.0015	mg/kg	0.00073	0.00073	0.00073		
BG01-SS07-01	0 - 1 ft	Fluorene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	1-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG01-SS07-01	0 - 1 ft	Naphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073	UJ	U
BG01-SS07-01	0 - 1 ft	2-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073	UJ	U
BG01-SS07-01 DUP	0 - 1 ft	Iron (Fe)	5500	mg/kg	110	23	37		
BG01-SS07-01 DUP	0 - 1 ft	Aluminum	5000	mg/kg	370	56	150		
BG01-SS07-01 DUP	0 - 1 ft	Lead	4.1	mg/kg	3.7	0.46	0.75		
BG01-SS07-01 DUP	0 - 1 ft	Magnesium (Mg)	410	mg/kg	37	2.6	3.7		
BG01-SS07-01 DUP	0 - 1 ft	Manganese (Mn)	39	mg/kg	0.75	0.14	0.19		
BG01-SS07-01 DUP	0 - 1 ft	Nickel	2.1	mg/kg	3.7	0.21	0.75	J	J
BG01-SS07-01 DUP	0 - 1 ft	Silver	< 0.19	mg/kg	0.75	0.061	0.19		U
BG01-SS07-01 DUP	0 - 1 ft	Sodium (Na)	52	mg/kg	37	1.5	3.7		
BG01-SS07-01 DUP	0 - 1 ft	Antimony	0.54	mg/kg	0.75	0.28	0.37	J	J
BG01-SS07-01 DUP	0 - 1 ft	Arsenic	1.2	mg/kg	1.5	0.54	0.75	J	J
BG01-SS07-01 DUP	0 - 1 ft	Barium	8.5	mg/kg	7.5	0.22	3.7		
BG01-SS07-01 DUP	0 - 1 ft	Beryllium	0.051	mg/kg	0.19	0.0094	0.037	J	J
BG01-SS07-01 DUP	0 - 1 ft	Cadmium	0.036	mg/kg	0.19	0.025	0.037	J	J
BG01-SS07-01 DUP	0 - 1 ft	Chromium	5.3	mg/kg	0.37	0.061	0.30		
BG01-SS07-01 DUP	0 - 1 ft	Cobalt	0.74	mg/kg	0.75	0.067	0.19	J	J
BG01-SS07-01 DUP	0 - 1 ft	Copper	13	mg/kg	3.7	0.31	0.75		
BG01-SS07-01 DUP	0 - 1 ft	Vanadium	8.9	mg/kg	1.9	0.094	0.75		
BG01-SS07-01 DUP	0 - 1 ft	Zinc	6.4	mg/kg	3.7	0.29	0.37		
BG01-SS07-01 DUP	0 - 1 ft	Calcium (Ca)	250	mg/kg	37	2.2	7.5		
BG01-SS07-01 DUP	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.87	1.1		U
BG01-SS07-01 DUP	0 - 1 ft	Potassium (K)	220	mg/kg	15	1.7	7.5		
BG01-SS07-01 DUP	0 - 1 ft	Thallium	0.13	mg/kg	0.15	0.036	0.038	J	J
BG01-SS07-01 DUP	0 - 1 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Pyrene	0.0024	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Benzo(g,h,i)perylene	0.00084	mg/kg	0.00076	0.00076	0.00076	J	
BG01-SS07-01 DUP	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Benzo(b)fluoranthene	0.0020	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Fluoranthene	0.0024	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Chrysene	0.0010	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Benzo(a)pyrene	0.00095	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Benzo(a)anthracene	0.0014	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Phenanthrene	0.0019	mg/kg	0.00076	0.00076	0.00076		
BG01-SS07-01 DUP	0 - 1 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG01-SS07-01 DUP	0 - 1 ft	Naphthalene	0.00099	mg/kg	0.00076	0.00076	0.00076	J	
BG01-SS07-01 DUP	0 - 1 ft	2-Methylnaphthalene	0.00087	mg/kg	0.00076	0.00076	0.00076	J	
BG01-SS08-01	0 - 1 ft	Iron (Fe)	3600	mg/kg	120	24	39		
BG01-SS08-01	0 - 1 ft	Aluminum	5500	mg/kg	390	58	150		
BG01-SS08-01	0 - 1 ft	Lead	3.1	mg/kg	3.9	0.48	0.77	J	J
BG01-SS08-01	0 - 1 ft	Magnesium (Mg)	300	mg/kg	39	2.7	3.9		
BG01-SS08-01	0 - 1 ft	Manganese (Mn)	30	mg/kg	0.77	0.14	0.19		
BG01-SS08-01	0 - 1 ft	Nickel	1.9	mg/kg	3.9	0.22	0.77	J	J
BG01-SS08-01	0 - 1 ft	Silver	< 0.19	mg/kg	0.77	0.063	0.19		U
BG01-SS08-01	0 - 1 ft	Sodium (Na)	50	mg/kg	39	1.6	3.9		
BG01-SS08-01	0 - 1 ft	Antimony	0.45	mg/kg	0.77	0.29	0.39	J	J
BG01-SS08-01	0 - 1 ft	Arsenic	< 0.77	mg/kg	1.5	0.56	0.77		U
BG01-SS08-01	0 - 1 ft	Barium	9.4	mg/kg	7.7	0.23	3.9		
BG01-SS08-01	0 - 1 ft	Beryllium	0.051	mg/kg	0.19	0.0098	0.039	J	J
BG01-SS08-01	0 - 1 ft	Cadmium	0.044	mg/kg	0.19	0.025	0.039	J	J
BG01-SS08-01	0 - 1 ft	Chromium	4.2	mg/kg	0.39	0.063	0.31		
BG01-SS08-01	0 - 1 ft	Cobalt	0.57	mg/kg	0.77	0.069	0.19	J	J
BG01-SS08-01	0 - 1 ft	Copper	9.0	mg/kg	3.9	0.32	0.77		
BG01-SS08-01	0 - 1 ft	Vanadium	7.1	mg/kg	1.9	0.098	0.77		
BG01-SS08-01	0 - 1 ft	Zinc	6.7	mg/kg	3.9	0.30	0.39		
BG01-SS08-01	0 - 1 ft	Calcium (Ca)	220	mg/kg	39	2.3	7.7		
BG01-SS08-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.5	0.90	1.2		U

Table 1
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Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG01-SS08-01	0 - 1 ft	Potassium (K)	200	mg/kg	15	1.8	7.7		
BG01-SS08-01	0 - 1 ft	Thallium	0.055	mg/kg	0.15	0.036	0.038	J	J
BG01-SS08-01	0 - 1 ft	Anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Pyrene	0.0016	mg/kg	0.00078	0.00078	0.00078		
BG01-SS08-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Benzo(b)fluoranthene	0.0013	mg/kg	0.00078	0.00078	0.00078		
BG01-SS08-01	0 - 1 ft	Fluoranthene	0.0017	mg/kg	0.00078	0.00078	0.00078		
BG01-SS08-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Acenaphthylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Chrysene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Benzo(a)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Benzo(a)anthracene	0.00088	mg/kg	0.00078	0.00078	0.00078		
BG01-SS08-01	0 - 1 ft	Acenaphthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Phenanthrene	0.0013	mg/kg	0.00078	0.00078	0.00078		
BG01-SS08-01	0 - 1 ft	Fluorene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	1-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	Naphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG01-SS08-01	0 - 1 ft	2-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SB01-05	4 - 5 ft	Iron (Fe)	13000	mg/kg	110	23	36		
BG03-SB01-05	4 - 5 ft	Magnesium (Mg)	2600	mg/kg	360	25	36		
BG03-SB01-05	4 - 5 ft	Aluminum	11000	mg/kg	360	54	140		
BG03-SB01-05	4 - 5 ft	Lead	2.7	mg/kg	3.6	0.45	0.72	J	J
BG03-SB01-05	4 - 5 ft	Manganese (Mn)	170	mg/kg	0.72	0.13	0.18		
BG03-SB01-05	4 - 5 ft	Nickel	8.8	mg/kg	3.6	0.20	0.72		
BG03-SB01-05	4 - 5 ft	Potassium (K)	1700	mg/kg	14	1.7	7.2		
BG03-SB01-05	4 - 5 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG03-SB01-05	4 - 5 ft	Sodium (Na)	75	mg/kg	36	1.5	3.6		
BG03-SB01-05	4 - 5 ft	Antimony	3.9	mg/kg	0.72	0.27	0.36		
BG03-SB01-05	4 - 5 ft	Arsenic	2.2	mg/kg	1.4	0.52	0.72		
BG03-SB01-05	4 - 5 ft	Barium	38	mg/kg	7.2	0.21	3.6		
BG03-SB01-05	4 - 5 ft	Beryllium	0.096	mg/kg	0.18	0.0091	0.036	J	J
BG03-SB01-05	4 - 5 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG03-SB01-05	4 - 5 ft	Chromium	17	mg/kg	0.36	0.059	0.29		
BG03-SB01-05	4 - 5 ft	Cobalt	3.7	mg/kg	0.72	0.065	0.18		
BG03-SB01-05	4 - 5 ft	Copper	33	mg/kg	3.6	0.30	0.72		
BG03-SB01-05	4 - 5 ft	Vanadium	20	mg/kg	1.8	0.091	0.72		
BG03-SB01-05	4 - 5 ft	Zinc	17	mg/kg	3.6	0.28	0.36		
BG03-SB01-05	4 - 5 ft	Calcium (Ca)	440	mg/kg	36	2.1	7.2		
BG03-SB01-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG03-SB01-05	4 - 5 ft	Thallium	0.18	mg/kg	0.14	0.035	0.036		
BG03-SB01-05	4 - 5 ft	Anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Acenaphthylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Chrysene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Benzo(a)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Benzo(a)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-05	4 - 5 ft	Acenaphthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Phenanthrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-05	4 - 5 ft	Fluorene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-05	4 - 5 ft	1-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	Naphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-05	4 - 5 ft	2-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Iron (Fe)	12000	mg/kg	110	23	37		
BG03-SB01-10	9 - 10 ft	Manganese (Mn)	210	mg/kg	7.4	1.4	1.8		
BG03-SB01-10	9 - 10 ft	Aluminum	5900	mg/kg	370	55	150		
BG03-SB01-10	9 - 10 ft	Lead	2.8	mg/kg	3.7	0.46	0.74	J	J
BG03-SB01-10	9 - 10 ft	Magnesium (Mg)	1000	mg/kg	37	2.6	3.7		
BG03-SB01-10	9 - 10 ft	Nickel	4.3	mg/kg	3.7	0.21	0.74		
BG03-SB01-10	9 - 10 ft	Potassium (K)	740	mg/kg	15	1.7	7.4		
BG03-SB01-10	9 - 10 ft	Silver	< 0.18	mg/kg	0.74	0.060	0.18		U
BG03-SB01-10	9 - 10 ft	Sodium (Na)	58	mg/kg	37	1.5	3.7		
BG03-SB01-10	9 - 10 ft	Antimony	2.3	mg/kg	0.74	0.28	0.37		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SB01-10	9 - 10 ft	Arsenic	3.0	mg/kg	1.5	0.53	0.74		
BG03-SB01-10	9 - 10 ft	Barium	25	mg/kg	7.4	0.22	3.7		
BG03-SB01-10	9 - 10 ft	Beryllium	0.10	mg/kg	0.18	0.0093	0.037	J	J
BG03-SB01-10	9 - 10 ft	Cadmium	< 0.037	mg/kg	0.18	0.024	0.037		U
BG03-SB01-10	9 - 10 ft	Chromium	11	mg/kg	0.37	0.061	0.29		
BG03-SB01-10	9 - 10 ft	Cobalt	2.3	mg/kg	0.74	0.066	0.18		
BG03-SB01-10	9 - 10 ft	Copper	28	mg/kg	3.7	0.31	0.74		
BG03-SB01-10	9 - 10 ft	Vanadium	15	mg/kg	1.8	0.093	0.74		
BG03-SB01-10	9 - 10 ft	Zinc	11	mg/kg	3.7	0.28	0.37		
BG03-SB01-10	9 - 10 ft	Calcium (Ca)	270	mg/kg	37	2.2	7.4		
BG03-SB01-10	9 - 10 ft	Selenium	< 1.1	mg/kg	1.5	0.86	1.1		U
BG03-SB01-10	9 - 10 ft	Thallium	0.092	mg/kg	0.14	0.033	0.034	J	J
BG03-SB01-10	9 - 10 ft	Anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Acenaphthylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Chrysene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Benzo(a)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Benzo(a)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-10	9 - 10 ft	Acenaphthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Phenanthrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-10	9 - 10 ft	Fluorene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB01-10	9 - 10 ft	1-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	Naphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB01-10	9 - 10 ft	2-Methylnaphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB02-05	4 - 5 ft	Iron (Fe)	17000	mg/kg	110	23	36	J+	
BG03-SB02-05	4 - 5 ft	Magnesium (Mg)	3500	mg/kg	360	25	36	J+	
BG03-SB02-05	4 - 5 ft	Manganese (Mn)	280	mg/kg	7.2	1.3	1.8	J	
BG03-SB02-05	4 - 5 ft	Potassium (K)	2500	mg/kg	140	17	72	J+	
BG03-SB02-05	4 - 5 ft	Aluminum	16000	mg/kg	360	54	140	J+	
BG03-SB02-05	4 - 5 ft	Lead	3.1	mg/kg	3.6	0.45	0.72	J	J
BG03-SB02-05	4 - 5 ft	Nickel	12	mg/kg	3.6	0.20	0.72		
BG03-SB02-05	4 - 5 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18	UJ	UX
BG03-SB02-05	4 - 5 ft	Sodium (Na)	92	mg/kg	36	1.5	3.6		
BG03-SB02-05	4 - 5 ft	Antimony	4.8	mg/kg	0.72	0.27	0.36		
BG03-SB02-05	4 - 5 ft	Arsenic	2.4	mg/kg	1.4	0.52	0.72	J-	X
BG03-SB02-05	4 - 5 ft	Barium	52	mg/kg	7.2	0.22	3.6	J+	X
BG03-SB02-05	4 - 5 ft	Beryllium	0.26	mg/kg	0.18	0.0092	0.036	J-	X
BG03-SB02-05	4 - 5 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036	UJ	UX
BG03-SB02-05	4 - 5 ft	Chromium	20	mg/kg	0.36	0.060	0.29	J+	X
BG03-SB02-05	4 - 5 ft	Cobalt	4.8	mg/kg	0.72	0.065	0.18	J-	X
BG03-SB02-05	4 - 5 ft	Copper	38	mg/kg	3.6	0.30	0.72	J+	X
BG03-SB02-05	4 - 5 ft	Vanadium	24	mg/kg	1.8	0.092	0.72	J+	X
BG03-SB02-05	4 - 5 ft	Zinc	23	mg/kg	3.6	0.28	0.36	J-	X
BG03-SB02-05	4 - 5 ft	Calcium (Ca)	450	mg/kg	36	2.1	7.2		
BG03-SB02-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1	UJ	UX
BG03-SB02-05	4 - 5 ft	Thallium	0.22	mg/kg	0.14	0.035	0.036		
BG03-SB02-05	4 - 5 ft	Anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB02-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Acenaphthylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Chrysene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Benzo(a)pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Benzo(a)anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB02-05	4 - 5 ft	Acenaphthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB02-05	4 - 5 ft	Phenanthrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQX
BG03-SB02-05	4 - 5 ft	Fluorene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB02-05	4 - 5 ft	1-Methylnaphthalene	0.00083	mg/kg	0.00074	0.00074	0.00074		X
BG03-SB02-05	4 - 5 ft	Naphthalene	0.0012	mg/kg	0.00074	0.00074	0.00074		X
BG03-SB02-05	4 - 5 ft	2-Methylnaphthalene	0.0018	mg/kg	0.00074	0.00074	0.00074		X

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SB02-10	9 - 10 ft	Iron (Fe)	13000	mg/kg	110	23	36		
BG03-SB02-10	9 - 10 ft	Magnesium (Mg)	2400	mg/kg	360	25	36		
BG03-SB02-10	9 - 10 ft	Aluminum	11000	mg/kg	360	54	140		
BG03-SB02-10	9 - 10 ft	Lead	2.8	mg/kg	3.6	0.45	0.72	J	J
BG03-SB02-10	9 - 10 ft	Manganese (Mn)	170	mg/kg	0.72	0.13	0.18		
BG03-SB02-10	9 - 10 ft	Nickel	7.9	mg/kg	3.6	0.20	0.72		
BG03-SB02-10	9 - 10 ft	Potassium (K)	1600	mg/kg	14	1.7	7.2		
BG03-SB02-10	9 - 10 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG03-SB02-10	9 - 10 ft	Sodium (Na)	85	mg/kg	36	1.5	3.6		
BG03-SB02-10	9 - 10 ft	Antimony	3.1	mg/kg	0.72	0.27	0.36		
BG03-SB02-10	9 - 10 ft	Arsenic	1.6	mg/kg	1.4	0.52	0.72		
BG03-SB02-10	9 - 10 ft	Barium	37	mg/kg	7.2	0.21	3.6		
BG03-SB02-10	9 - 10 ft	Beryllium	0.058	mg/kg	0.18	0.0091	0.036	J	J
BG03-SB02-10	9 - 10 ft	Cadmium	0.051	mg/kg	0.18	0.024	0.036	J	J
BG03-SB02-10	9 - 10 ft	Chromium	15	mg/kg	0.36	0.059	0.29		
BG03-SB02-10	9 - 10 ft	Cobalt	2.8	mg/kg	0.72	0.065	0.18		
BG03-SB02-10	9 - 10 ft	Copper	29	mg/kg	3.6	0.30	0.72		
BG03-SB02-10	9 - 10 ft	Vanadium	18	mg/kg	1.8	0.091	0.72		
BG03-SB02-10	9 - 10 ft	Zinc	16	mg/kg	3.6	0.28	0.36		
BG03-SB02-10	9 - 10 ft	Calcium (Ca)	430	mg/kg	36	2.1	7.2		
BG03-SB02-10	9 - 10 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG03-SB02-10	9 - 10 ft	Thallium	0.12	mg/kg	0.14	0.034	0.035	J	J
BG03-SB02-10	9 - 10 ft	Anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UQ
BG03-SB02-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Acenaphthylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Chrysene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Benzo(a)pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Benzo(a)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UQ
BG03-SB02-10	9 - 10 ft	Acenaphthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Phenanthrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UQ
BG03-SB02-10	9 - 10 ft	Fluorene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UQ
BG03-SB02-10	9 - 10 ft	1-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	Naphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB02-10	9 - 10 ft	2-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG03-SB03-05	4 - 5 ft	Magnesium (Mg)	3900	mg/kg	360	25	36		
BG03-SB03-05	4 - 5 ft	Manganese (Mn)	370	mg/kg	7.2	1.3	1.8		
BG03-SB03-05	4 - 5 ft	Potassium (K)	3100	mg/kg	140	17	72		
BG03-SB03-05	4 - 5 ft	Aluminum	16000	mg/kg	360	54	140		
BG03-SB03-05	4 - 5 ft	Iron (Fe)	19000	mg/kg	1100	230	360		
BG03-SB03-05	4 - 5 ft	Lead	3.0	mg/kg	3.6	0.45	0.72	J	J
BG03-SB03-05	4 - 5 ft	Nickel	12	mg/kg	3.6	0.20	0.72		
BG03-SB03-05	4 - 5 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG03-SB03-05	4 - 5 ft	Sodium (Na)	100	mg/kg	36	1.5	3.6		
BG03-SB03-05	4 - 5 ft	Antimony	5.4	mg/kg	0.72	0.27	0.36		
BG03-SB03-05	4 - 5 ft	Arsenic	2.4	mg/kg	1.4	0.52	0.72		
BG03-SB03-05	4 - 5 ft	Barium	55	mg/kg	7.2	0.21	3.6		
BG03-SB03-05	4 - 5 ft	Beryllium	0.18	mg/kg	0.18	0.0092	0.036		J
BG03-SB03-05	4 - 5 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG03-SB03-05	4 - 5 ft	Chromium	21	mg/kg	0.36	0.059	0.29		
BG03-SB03-05	4 - 5 ft	Cobalt	5.2	mg/kg	0.72	0.065	0.18		
BG03-SB03-05	4 - 5 ft	Copper	42	mg/kg	3.6	0.30	0.72		
BG03-SB03-05	4 - 5 ft	Vanadium	25	mg/kg	1.8	0.092	0.72		
BG03-SB03-05	4 - 5 ft	Zinc	23	mg/kg	3.6	0.28	0.36		
BG03-SB03-05	4 - 5 ft	Calcium (Ca)	510	mg/kg	36	2.1	7.2		
BG03-SB03-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG03-SB03-05	4 - 5 ft	Thallium	0.19	mg/kg	0.15	0.035	0.036		
BG03-SB03-05	4 - 5 ft	Anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB03-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Acenaphthylene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SB03-05	4 - 5 ft	Chrysene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Benzo(a)pyrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Benzo(a)anthracene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB03-05	4 - 5 ft	Acenaphthene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	Phenanthrene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB03-05	4 - 5 ft	Fluorene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		UQ
BG03-SB03-05	4 - 5 ft	1-Methylnaphthalene	0.00096	mg/kg	0.00073	0.00073	0.00073		
BG03-SB03-05	4 - 5 ft	Naphthalene	< 0.00073	mg/kg	0.00073	0.00073	0.00073		U
BG03-SB03-05	4 - 5 ft	2-Methylnaphthalene	0.0021	mg/kg	0.00073	0.00073	0.00073		
BG03-SB03-10	9 - 10 ft	Iron (Fe)	16000	mg/kg	110	22	35		
BG03-SB03-10	9 - 10 ft	Magnesium (Mg)	3600	mg/kg	350	25	35		
BG03-SB03-10	9 - 10 ft	Manganese (Mn)	310	mg/kg	7.1	1.3	1.8		
BG03-SB03-10	9 - 10 ft	Potassium (K)	2400	mg/kg	140	16	71		
BG03-SB03-10	9 - 10 ft	Aluminum	13000	mg/kg	350	53	140		
BG03-SB03-10	9 - 10 ft	Lead	2.9	mg/kg	3.5	0.44	0.71	J	J
BG03-SB03-10	9 - 10 ft	Nickel	11	mg/kg	3.5	0.20	0.71		
BG03-SB03-10	9 - 10 ft	Silver	< 0.18	mg/kg	0.71	0.058	0.18		U
BG03-SB03-10	9 - 10 ft	Sodium (Na)	150	mg/kg	35	1.4	3.5		
BG03-SB03-10	9 - 10 ft	Antimony	5.5	mg/kg	0.71	0.27	0.35		
BG03-SB03-10	9 - 10 ft	Arsenic	2.5	mg/kg	1.4	0.51	0.71		
BG03-SB03-10	9 - 10 ft	Barium	58	mg/kg	7.1	0.21	3.5		
BG03-SB03-10	9 - 10 ft	Beryllium	0.055	mg/kg	0.18	0.0090	0.035	J	J
BG03-SB03-10	9 - 10 ft	Cadmium	0.076	mg/kg	0.18	0.023	0.035	J	J
BG03-SB03-10	9 - 10 ft	Chromium	20	mg/kg	0.35	0.058	0.28		
BG03-SB03-10	9 - 10 ft	Cobalt	5.3	mg/kg	0.71	0.064	0.18		
BG03-SB03-10	9 - 10 ft	Copper	40	mg/kg	3.5	0.29	0.71		
BG03-SB03-10	9 - 10 ft	Vanadium	25	mg/kg	1.8	0.090	0.71		
BG03-SB03-10	9 - 10 ft	Zinc	22	mg/kg	3.5	0.27	0.35		
BG03-SB03-10	9 - 10 ft	Calcium (Ca)	960	mg/kg	35	2.1	7.1		
BG03-SB03-10	9 - 10 ft	Selenium	< 1.1	mg/kg	1.4	0.82	1.1		U
BG03-SB03-10	9 - 10 ft	Thallium	0.17	mg/kg	0.14	0.034	0.035		
BG03-SB03-10	9 - 10 ft	Anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UQ
BG03-SB03-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Acenaphthylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Chrysene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Benzo(a)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Benzo(a)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UQ
BG03-SB03-10	9 - 10 ft	Acenaphthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Phenanthrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UQ
BG03-SB03-10	9 - 10 ft	Fluorene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UQ
BG03-SB03-10	9 - 10 ft	1-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	Naphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB03-10	9 - 10 ft	2-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG03-SB04-04	3 - 4 ft	Iron (Fe)	17000	mg/kg	120	25	39		
BG03-SB04-04	3 - 4 ft	Magnesium (Mg)	2800	mg/kg	390	27	39		
BG03-SB04-04	3 - 4 ft	Manganese (Mn)	280	mg/kg	7.8	1.4	2.0		
BG03-SB04-04	3 - 4 ft	Aluminum	14000	mg/kg	390	59	160		
BG03-SB04-04	3 - 4 ft	Lead	3.5	mg/kg	3.9	0.49	0.78	J	J
BG03-SB04-04	3 - 4 ft	Nickel	11	mg/kg	3.9	0.22	0.78		
BG03-SB04-04	3 - 4 ft	Potassium (K)	1700	mg/kg	16	1.8	7.8		
BG03-SB04-04	3 - 4 ft	Silver	< 0.20	mg/kg	0.78	0.064	0.20		U
BG03-SB04-04	3 - 4 ft	Sodium (Na)	84	mg/kg	39	1.6	3.9		
BG03-SB04-04	3 - 4 ft	Antimony	5.6	mg/kg	0.78	0.29	0.39		
BG03-SB04-04	3 - 4 ft	Arsenic	2.1	mg/kg	1.6	0.57	0.78		
BG03-SB04-04	3 - 4 ft	Barium	42	mg/kg	7.8	0.23	3.9		
BG03-SB04-04	3 - 4 ft	Beryllium	0.24	mg/kg	0.20	0.0099	0.039		
BG03-SB04-04	3 - 4 ft	Cadmium	0.080	mg/kg	0.20	0.026	0.039	J	J
BG03-SB04-04	3 - 4 ft	Chromium	18	mg/kg	0.39	0.065	0.31		
BG03-SB04-04	3 - 4 ft	Cobalt	5.3	mg/kg	0.78	0.071	0.20		
BG03-SB04-04	3 - 4 ft	Copper	40	mg/kg	3.9	0.33	0.78		
BG03-SB04-04	3 - 4 ft	Vanadium	24	mg/kg	2.0	0.10	0.78		
BG03-SB04-04	3 - 4 ft	Zinc	20	mg/kg	3.9	0.30	0.39		
BG03-SB04-04	3 - 4 ft	Calcium (Ca)	330	mg/kg	39	2.3	7.8		

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SB04-04	3 - 4 ft	Selenium	< 1.2	mg/kg	1.6	0.91	1.2		U
BG03-SB04-04	3 - 4 ft	Thallium	0.17	mg/kg	0.15	0.037	0.038		
BG03-SB04-04	3 - 4 ft	Anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UQ
BG03-SB04-04	3 - 4 ft	Benzo(g,h,i)perylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Indeno(1,2,3-cd)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Benzo(b)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Benzo(k)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Acenaphthylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Chrysene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Benzo(a)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Dibenz(a,h)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Benzo(a)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UQ
BG03-SB04-04	3 - 4 ft	Acenaphthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Phenanthrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UQ
BG03-SB04-04	3 - 4 ft	Fluorene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UQ
BG03-SB04-04	3 - 4 ft	1-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	Naphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-04	3 - 4 ft	2-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG03-SB04-05	4 - 5 ft	Iron (Fe)	10000	mg/kg	110	23	37		
BG03-SB04-05	4 - 5 ft	Aluminum	8100	mg/kg	370	55	150		
BG03-SB04-05	4 - 5 ft	Lead	2.1	mg/kg	3.7	0.46	0.73	J	J
BG03-SB04-05	4 - 5 ft	Magnesium (Mg)	1300	mg/kg	37	2.6	3.7		
BG03-SB04-05	4 - 5 ft	Manganese (Mn)	130	mg/kg	0.73	0.13	0.18		
BG03-SB04-05	4 - 5 ft	Nickel	5.8	mg/kg	3.7	0.21	0.73		
BG03-SB04-05	4 - 5 ft	Potassium (K)	870	mg/kg	15	1.7	7.3		
BG03-SB04-05	4 - 5 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG03-SB04-05	4 - 5 ft	Sodium (Na)	80	mg/kg	37	1.5	3.7		
BG03-SB04-05	4 - 5 ft	Antimony	2.6	mg/kg	0.73	0.27	0.37		
BG03-SB04-05	4 - 5 ft	Arsenic	1.3	mg/kg	1.5	0.53	0.73	J	J
BG03-SB04-05	4 - 5 ft	Barium	28	mg/kg	7.3	0.22	3.7		
BG03-SB04-05	4 - 5 ft	Beryllium	0.085	mg/kg	0.18	0.0093	0.037	J	J
BG03-SB04-05	4 - 5 ft	Cadmium	0.067	mg/kg	0.18	0.024	0.037	J	J
BG03-SB04-05	4 - 5 ft	Chromium	12	mg/kg	0.37	0.060	0.29		
BG03-SB04-05	4 - 5 ft	Cobalt	2.4	mg/kg	0.73	0.066	0.18		
BG03-SB04-05	4 - 5 ft	Copper	23	mg/kg	3.7	0.30	0.73		
BG03-SB04-05	4 - 5 ft	Vanadium	15	mg/kg	1.8	0.093	0.73		
BG03-SB04-05	4 - 5 ft	Zinc	11	mg/kg	3.7	0.28	0.37		
BG03-SB04-05	4 - 5 ft	Calcium (Ca)	320	mg/kg	37	2.2	7.3		
BG03-SB04-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG03-SB04-05	4 - 5 ft	Thallium	0.088	mg/kg	0.15	0.036	0.037	J	J
BG03-SB04-05	4 - 5 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UQ
BG03-SB04-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Chrysene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Benzo(a)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Benzo(a)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UQ
BG03-SB04-05	4 - 5 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Phenanthrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UQ
BG03-SB04-05	4 - 5 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UQ
BG03-SB04-05	4 - 5 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05	4 - 5 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SB04-05 DUP	4 - 5 ft	Iron (Fe)	13000	mg/kg	110	23	36		
BG03-SB04-05 DUP	4 - 5 ft	Aluminum	10000	mg/kg	360	54	140		
BG03-SB04-05 DUP	4 - 5 ft	Lead	2.6	mg/kg	3.6	0.45	0.72	J	J
BG03-SB04-05 DUP	4 - 5 ft	Magnesium (Mg)	1700	mg/kg	36	2.5	3.6		
BG03-SB04-05 DUP	4 - 5 ft	Manganese (Mn)	170	mg/kg	0.72	0.13	0.18		
BG03-SB04-05 DUP	4 - 5 ft	Nickel	7.0	mg/kg	3.6	0.20	0.72		
BG03-SB04-05 DUP	4 - 5 ft	Potassium (K)	1200	mg/kg	14	1.7	7.2		
BG03-SB04-05 DUP	4 - 5 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG03-SB04-05 DUP	4 - 5 ft	Sodium (Na)	80	mg/kg	36	1.5	3.6		
BG03-SB04-05 DUP	4 - 5 ft	Antimony	3.4	mg/kg	0.72	0.27	0.36		

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SB04-05 DUP	4 - 5 ft	Arsenic	2.3	mg/kg	1.4	0.52	0.72	J	
BG03-SB04-05 DUP	4 - 5 ft	Barium	33	mg/kg	7.2	0.22	3.6		
BG03-SB04-05 DUP	4 - 5 ft	Beryllium	0.15	mg/kg	0.18	0.0092	0.036	J	J
BG03-SB04-05 DUP	4 - 5 ft	Cadmium	0.065	mg/kg	0.18	0.024	0.036	J	J
BG03-SB04-05 DUP	4 - 5 ft	Chromium	13	mg/kg	0.36	0.060	0.29		
BG03-SB04-05 DUP	4 - 5 ft	Cobalt	3.1	mg/kg	0.72	0.065	0.18		
BG03-SB04-05 DUP	4 - 5 ft	Copper	35	mg/kg	3.6	0.30	0.72		
BG03-SB04-05 DUP	4 - 5 ft	Vanadium	18	mg/kg	1.8	0.092	0.72		
BG03-SB04-05 DUP	4 - 5 ft	Zinc	13	mg/kg	3.6	0.28	0.36		
BG03-SB04-05 DUP	4 - 5 ft	Calcium (Ca)	290	mg/kg	36	2.1	7.2		
BG03-SB04-05 DUP	4 - 5 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG03-SB04-05 DUP	4 - 5 ft	Thallium	0.15	mg/kg	0.14	0.034	0.035	J	
BG03-SB04-05 DUP	4 - 5 ft	Anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB04-05 DUP	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Benzo(b)fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Benzo(k)fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Acenaphthylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Chrysene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Benzo(a)pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Benzo(a)anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB04-05 DUP	4 - 5 ft	Acenaphthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Phenanthrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB04-05 DUP	4 - 5 ft	Fluorene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		UQ
BG03-SB04-05 DUP	4 - 5 ft	1-Methylnaphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	Naphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SB04-05 DUP	4 - 5 ft	2-Methylnaphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG03-SS01-01	0 - 1 ft	Iron (Fe)	14000	mg/kg	110	23	37		
BG03-SS01-01	0 - 1 ft	Aluminum	14000	mg/kg	370	55	150		
BG03-SS01-01	0 - 1 ft	Lead	4.0	mg/kg	3.7	0.46	0.73		
BG03-SS01-01	0 - 1 ft	Magnesium (Mg)	1400	mg/kg	37	2.6	3.7		
BG03-SS01-01	0 - 1 ft	Manganese (Mn)	100	mg/kg	0.73	0.14	0.18		
BG03-SS01-01	0 - 1 ft	Nickel	8.8	mg/kg	3.7	0.21	0.73		
BG03-SS01-01	0 - 1 ft	Potassium (K)	470	mg/kg	15	1.7	7.3		
BG03-SS01-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG03-SS01-01	0 - 1 ft	Sodium (Na)	57	mg/kg	37	1.5	3.7		
BG03-SS01-01	0 - 1 ft	Antimony	3.3	mg/kg	0.73	0.28	0.37		
BG03-SS01-01	0 - 1 ft	Arsenic	2.3	mg/kg	1.5	0.53	0.73		
BG03-SS01-01	0 - 1 ft	Barium	24	mg/kg	7.3	0.22	3.7		
BG03-SS01-01	0 - 1 ft	Beryllium	0.057	mg/kg	0.18	0.0093	0.037	J	J
BG03-SS01-01	0 - 1 ft	Cadmium	< 0.037	mg/kg	0.18	0.024	0.037		U
BG03-SS01-01	0 - 1 ft	Chromium	17	mg/kg	0.37	0.060	0.29		
BG03-SS01-01	0 - 1 ft	Cobalt	3.3	mg/kg	0.73	0.066	0.18		
BG03-SS01-01	0 - 1 ft	Copper	30	mg/kg	3.7	0.31	0.73		
BG03-SS01-01	0 - 1 ft	Vanadium	22	mg/kg	1.8	0.093	0.73		
BG03-SS01-01	0 - 1 ft	Zinc	14	mg/kg	3.7	0.28	0.37		
BG03-SS01-01	0 - 1 ft	Calcium (Ca)	430	mg/kg	37	2.2	7.3		
BG03-SS01-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG03-SS01-01	0 - 1 ft	Thallium	0.076	mg/kg	0.15	0.036	0.037	J	J
BG03-SS01-01	0 - 1 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Pyrene	0.0015	mg/kg	0.00076	0.00076	0.00076		Q
BG03-SS01-01	0 - 1 ft	Benzo(g,h,i)perylene	0.00083	mg/kg	0.00076	0.00076	0.00076		
BG03-SS01-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Benzo(b)fluoranthene	0.0013	mg/kg	0.00076	0.00076	0.00076		
BG03-SS01-01	0 - 1 ft	Fluoranthene	0.0015	mg/kg	0.00076	0.00076	0.00076		
BG03-SS01-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Chrysene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Benzo(a)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Benzo(a)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UQ
BG03-SS01-01	0 - 1 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Phenanthrene	0.0015	mg/kg	0.00076	0.00076	0.00076	J+	Q
BG03-SS01-01	0 - 1 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UQ
BG03-SS01-01	0 - 1 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG03-SS01-01	0 - 1 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SS02-01	0 - 1 ft	Iron (Fe)	16000	mg/kg	120	24	39		
BG03-SS02-01	0 - 1 ft	Aluminum	17000	mg/kg	390	59	160		
BG03-SS02-01	0 - 1 ft	Lead	4.7	mg/kg	3.9	0.49	0.78		
BG03-SS02-01	0 - 1 ft	Magnesium (Mg)	1800	mg/kg	39	2.7	3.9		
BG03-SS02-01	0 - 1 ft	Manganese (Mn)	120	mg/kg	0.78	0.14	0.20		
BG03-SS02-01	0 - 1 ft	Nickel	9.7	mg/kg	3.9	0.22	0.78		
BG03-SS02-01	0 - 1 ft	Potassium (K)	640	mg/kg	16	1.8	7.8		
BG03-SS02-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.78	0.064	0.20		U
BG03-SS02-01	0 - 1 ft	Sodium (Na)	59	mg/kg	39	1.6	3.9		
BG03-SS02-01	0 - 1 ft	Antimony	3.4	mg/kg	0.78	0.29	0.39		
BG03-SS02-01	0 - 1 ft	Arsenic	2.8	mg/kg	1.6	0.57	0.78		
BG03-SS02-01	0 - 1 ft	Barium	29	mg/kg	7.8	0.23	3.9		
BG03-SS02-01	0 - 1 ft	Beryllium	0.034	mg/kg	0.20	0.0099	0.039	J	J
BG03-SS02-01	0 - 1 ft	Cadmium	< 0.039	mg/kg	0.20	0.026	0.039		U
BG03-SS02-01	0 - 1 ft	Chromium	20	mg/kg	0.39	0.064	0.31		
BG03-SS02-01	0 - 1 ft	Cobalt	3.3	mg/kg	0.78	0.070	0.20		
BG03-SS02-01	0 - 1 ft	Copper	33	mg/kg	3.9	0.32	0.78		
BG03-SS02-01	0 - 1 ft	Vanadium	25	mg/kg	2.0	0.099	0.78		
BG03-SS02-01	0 - 1 ft	Zinc	21	mg/kg	3.9	0.30	0.39		
BG03-SS02-01	0 - 1 ft	Calcium (Ca)	400	mg/kg	39	2.3	7.8		
BG03-SS02-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.91	1.2		U
BG03-SS02-01	0 - 1 ft	Thallium	0.097	mg/kg	0.16	0.038	0.039	J	J
BG03-SS02-01	0 - 1 ft	Anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		UQ
BG03-SS02-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Benzo(b)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Acenaphthylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Chrysene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Benzo(a)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Benzo(a)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		UQ
BG03-SS02-01	0 - 1 ft	Acenaphthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS02-01	0 - 1 ft	Phenanthrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		UQ
BG03-SS02-01	0 - 1 ft	Fluorene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		UQ
BG03-SS02-01	0 - 1 ft	1-Methylnaphthalene	0.00082	mg/kg	0.00079	0.00079	0.00079		
BG03-SS02-01	0 - 1 ft	Naphthalene	0.0017	mg/kg	0.00079	0.00079	0.00079		
BG03-SS02-01	0 - 1 ft	2-Methylnaphthalene	0.0016	mg/kg	0.00079	0.00079	0.00079		
BG03-SS03-01	0 - 1 ft	Iron (Fe)	18000	mg/kg	110	24	38		
BG03-SS03-01	0 - 1 ft	Magnesium (Mg)	2500	mg/kg	380	27	38		
BG03-SS03-01	0 - 1 ft	Aluminum	21000	mg/kg	760	110	310		
BG03-SS03-01	0 - 1 ft	Lead	4.8	mg/kg	3.8	0.47	0.76		
BG03-SS03-01	0 - 1 ft	Manganese (Mn)	120	mg/kg	0.76	0.14	0.19		
BG03-SS03-01	0 - 1 ft	Nickel	14	mg/kg	3.8	0.22	0.76		
BG03-SS03-01	0 - 1 ft	Potassium (K)	740	mg/kg	15	1.8	7.6		
BG03-SS03-01	0 - 1 ft	Silver	< 0.19	mg/kg	0.76	0.062	0.19		U
BG03-SS03-01	0 - 1 ft	Sodium (Na)	76	mg/kg	38	1.6	3.8		
BG03-SS03-01	0 - 1 ft	Antimony	5.3	mg/kg	0.76	0.29	0.38		
BG03-SS03-01	0 - 1 ft	Arsenic	2.4	mg/kg	1.5	0.55	0.76		
BG03-SS03-01	0 - 1 ft	Barium	34	mg/kg	7.6	0.23	3.8		
BG03-SS03-01	0 - 1 ft	Beryllium	0.035	mg/kg	0.19	0.0097	0.038	J	J
BG03-SS03-01	0 - 1 ft	Cadmium	0.073	mg/kg	0.19	0.025	0.038	J	J
BG03-SS03-01	0 - 1 ft	Chromium	24	mg/kg	0.38	0.063	0.31		
BG03-SS03-01	0 - 1 ft	Cobalt	4.9	mg/kg	0.76	0.069	0.19		
BG03-SS03-01	0 - 1 ft	Copper	41	mg/kg	3.8	0.32	0.76		
BG03-SS03-01	0 - 1 ft	Vanadium	30	mg/kg	1.9	0.097	0.76		
BG03-SS03-01	0 - 1 ft	Zinc	19	mg/kg	3.8	0.29	0.38		
BG03-SS03-01	0 - 1 ft	Calcium (Ca)	520	mg/kg	38	2.2	7.6		
BG03-SS03-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.89	1.1		U
BG03-SS03-01	0 - 1 ft	Thallium	0.10	mg/kg	0.15	0.037	0.039	J	J
BG03-SS03-01	0 - 1 ft	Anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		UQ
BG03-SS03-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Benzo(b)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Acenaphthylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SS03-01	0 - 1 ft	Chrysene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Benzo(a)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Benzo(a)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		UQ
BG03-SS03-01	0 - 1 ft	Acenaphthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG03-SS03-01	0 - 1 ft	Phenanthrene	0.00096	mg/kg	0.00078	0.00078	0.00078	J+	Q
BG03-SS03-01	0 - 1 ft	Fluorene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		UQ
BG03-SS03-01	0 - 1 ft	1-Methylnaphthalene	0.0014	mg/kg	0.00078	0.00078	0.00078		
BG03-SS03-01	0 - 1 ft	Naphthalene	0.0024	mg/kg	0.00078	0.00078	0.00078		
BG03-SS03-01	0 - 1 ft	2-Methylnaphthalene	0.0027	mg/kg	0.00078	0.00078	0.00078		
BG03-SS04-01	0 - 1 ft	Iron (Fe)	16000	mg/kg	120	25	40		
BG03-SS04-01	0 - 1 ft	Magnesium (Mg)	2500	mg/kg	400	28	40		
BG03-SS04-01	0 - 1 ft	Aluminum	19000	mg/kg	400	60	160		
BG03-SS04-01	0 - 1 ft	Lead	5.7	mg/kg	4.0	0.50	0.80		
BG03-SS04-01	0 - 1 ft	Manganese (Mn)	120	mg/kg	0.80	0.15	0.20		
BG03-SS04-01	0 - 1 ft	Nickel	12	mg/kg	4.0	0.23	0.80		
BG03-SS04-01	0 - 1 ft	Potassium (K)	810	mg/kg	16	1.9	8.0		
BG03-SS04-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.80	0.065	0.20		U
BG03-SS04-01	0 - 1 ft	Sodium (Na)	80	mg/kg	40	1.6	4.0		
BG03-SS04-01	0 - 1 ft	Antimony	4.7	mg/kg	0.80	0.30	0.40		
BG03-SS04-01	0 - 1 ft	Arsenic	3.0	mg/kg	1.6	0.58	0.80		
BG03-SS04-01	0 - 1 ft	Barium	38	mg/kg	8.0	0.24	4.0		
BG03-SS04-01	0 - 1 ft	Beryllium	0.10	mg/kg	0.20	0.010	0.040	J	J
BG03-SS04-01	0 - 1 ft	Cadmium	0.16	mg/kg	0.20	0.026	0.040	J	J
BG03-SS04-01	0 - 1 ft	Chromium	23	mg/kg	0.40	0.066	0.32		
BG03-SS04-01	0 - 1 ft	Cobalt	4.3	mg/kg	0.80	0.072	0.20		
BG03-SS04-01	0 - 1 ft	Copper	37	mg/kg	4.0	0.33	0.80		
BG03-SS04-01	0 - 1 ft	Vanadium	29	mg/kg	2.0	0.10	0.80		
BG03-SS04-01	0 - 1 ft	Zinc	39	mg/kg	4.0	0.31	0.40		
BG03-SS04-01	0 - 1 ft	Calcium (Ca)	470	mg/kg	40	2.3	8.0		
BG03-SS04-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.93	1.2		U
BG03-SS04-01	0 - 1 ft	Thallium	0.11	mg/kg	0.16	0.038	0.039	J	J
BG03-SS04-01	0 - 1 ft	Pyrene	0.030	mg/kg	0.0079	0.0079	0.0079		
BG03-SS04-01	0 - 1 ft	Fluoranthene	0.038	mg/kg	0.0079	0.0079	0.0079		
BG03-SS04-01	0 - 1 ft	Anthracene	0.0029	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0086	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0086	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Benzo(b)fluoranthene	0.037	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Benzo(k)fluoranthene	0.0080	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Acenaphthylene	0.0018	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Chrysene	0.019	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Benzo(a)pyrene	0.019	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG03-SS04-01	0 - 1 ft	Benzo(a)anthracene	0.022	mg/kg	0.00079	0.00079	0.00079	J+	Q
BG03-SS04-01	0 - 1 ft	Acenaphthene	0.0017	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Phenanthrene	0.031	mg/kg	0.00079	0.00079	0.00079	J+	Q
BG03-SS04-01	0 - 1 ft	Fluorene	0.0021	mg/kg	0.00079	0.00079	0.00079	J+	Q
BG03-SS04-01	0 - 1 ft	1-Methylnaphthalene	0.0018	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	Naphthalene	0.0033	mg/kg	0.00079	0.00079	0.00079		
BG03-SS04-01	0 - 1 ft	2-Methylnaphthalene	0.0030	mg/kg	0.00079	0.00079	0.00079		
BG03-SS05-01	0 - 1 ft	Iron (Fe)	14000	mg/kg	130	27	44		
BG03-SS05-01	0 - 1 ft	Aluminum	22000	mg/kg	880	130	350		
BG03-SS05-01	0 - 1 ft	Lead	7.4	mg/kg	4.4	0.55	0.88		
BG03-SS05-01	0 - 1 ft	Magnesium (Mg)	1400	mg/kg	44	3.1	4.4		
BG03-SS05-01	0 - 1 ft	Manganese (Mn)	86	mg/kg	0.88	0.16	0.22		
BG03-SS05-01	0 - 1 ft	Nickel	9.8	mg/kg	4.4	0.25	0.88		
BG03-SS05-01	0 - 1 ft	Potassium (K)	700	mg/kg	18	2.0	8.8		
BG03-SS05-01	0 - 1 ft	Silver	< 0.22	mg/kg	0.88	0.072	0.22		U
BG03-SS05-01	0 - 1 ft	Sodium (Na)	58	mg/kg	44	1.8	4.4		
BG03-SS05-01	0 - 1 ft	Antimony	2.7	mg/kg	0.88	0.33	0.44		
BG03-SS05-01	0 - 1 ft	Arsenic	2.3	mg/kg	1.8	0.64	0.88		
BG03-SS05-01	0 - 1 ft	Barium	34	mg/kg	8.8	0.26	4.4		
BG03-SS05-01	0 - 1 ft	Beryllium	0.10	mg/kg	0.22	0.011	0.044	J	J
BG03-SS05-01	0 - 1 ft	Cadmium	0.081	mg/kg	0.22	0.029	0.044	J	J
BG03-SS05-01	0 - 1 ft	Chromium	21	mg/kg	0.44	0.072	0.35		
BG03-SS05-01	0 - 1 ft	Cobalt	2.5	mg/kg	0.88	0.079	0.22		
BG03-SS05-01	0 - 1 ft	Copper	29	mg/kg	4.4	0.36	0.88		
BG03-SS05-01	0 - 1 ft	Vanadium	27	mg/kg	2.2	0.11	0.88		
BG03-SS05-01	0 - 1 ft	Zinc	17	mg/kg	4.4	0.34	0.44		
BG03-SS05-01	0 - 1 ft	Calcium (Ca)	380	mg/kg	44	2.6	8.8		

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SS05-01	0 - 1 ft	Selenium	< 1.3	mg/kg	1.8	1.0	1.3		U
BG03-SS05-01	0 - 1 ft	Thallium	0.084	mg/kg	0.17	0.042	0.043	J	J
BG03-SS05-01	0 - 1 ft	Anthracene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Pyrene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		UQ
BG03-SS05-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Benzo(b)fluoranthene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Fluoranthene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Acenaphthylene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Chrysene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Benzo(a)pyrene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Benzo(a)anthracene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		UQ
BG03-SS05-01	0 - 1 ft	Acenaphthene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Phenanthrene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		UQ
BG03-SS05-01	0 - 1 ft	Fluorene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		UQ
BG03-SS05-01	0 - 1 ft	1-Methylnaphthalene	< 0.00086	mg/kg	0.00086	0.00086	0.00086		U
BG03-SS05-01	0 - 1 ft	Naphthalene	0.0012	mg/kg	0.00086	0.00086	0.00086		
BG03-SS05-01	0 - 1 ft	2-Methylnaphthalene	0.0012	mg/kg	0.00086	0.00086	0.00086		
BG03-SS06-01	0 - 1 ft	Iron (Fe)	11000	mg/kg	130	27	43		
BG03-SS06-01	0 - 1 ft	Aluminum	14000	mg/kg	430	65	170		
BG03-SS06-01	0 - 1 ft	Lead	5.5	mg/kg	4.3	0.54	0.87		
BG03-SS06-01	0 - 1 ft	Magnesium (Mg)	1200	mg/kg	43	3.0	4.3		
BG03-SS06-01	0 - 1 ft	Manganese (Mn)	71	mg/kg	0.87	0.16	0.22		
BG03-SS06-01	0 - 1 ft	Nickel	7.1	mg/kg	4.3	0.24	0.87		
BG03-SS06-01	0 - 1 ft	Potassium (K)	500	mg/kg	17	2.0	8.7		
BG03-SS06-01	0 - 1 ft	Silver	< 0.22	mg/kg	0.87	0.071	0.22		U
BG03-SS06-01	0 - 1 ft	Sodium (Na)	57	mg/kg	43	1.8	4.3		
BG03-SS06-01	0 - 1 ft	Antimony	2.3	mg/kg	0.87	0.33	0.43		
BG03-SS06-01	0 - 1 ft	Arsenic	1.9	mg/kg	1.7	0.63	0.87		
BG03-SS06-01	0 - 1 ft	Barium	21	mg/kg	8.7	0.26	4.3		
BG03-SS06-01	0 - 1 ft	Beryllium	0.036	mg/kg	0.22	0.011	0.043	J	J
BG03-SS06-01	0 - 1 ft	Cadmium	0.067	mg/kg	0.22	0.029	0.043	J	J
BG03-SS06-01	0 - 1 ft	Chromium	16	mg/kg	0.43	0.071	0.35		
BG03-SS06-01	0 - 1 ft	Cobalt	2.1	mg/kg	0.87	0.078	0.22		
BG03-SS06-01	0 - 1 ft	Copper	24	mg/kg	4.3	0.36	0.87		
BG03-SS06-01	0 - 1 ft	Vanadium	21	mg/kg	2.2	0.11	0.87		
BG03-SS06-01	0 - 1 ft	Zinc	13	mg/kg	4.3	0.33	0.43		
BG03-SS06-01	0 - 1 ft	Calcium (Ca)	340	mg/kg	43	2.5	8.7		
BG03-SS06-01	0 - 1 ft	Selenium	< 1.3	mg/kg	1.7	1.0	1.3		U
BG03-SS06-01	0 - 1 ft	Thallium	0.081	mg/kg	0.18	0.043	0.045	J	J
BG03-SS06-01	0 - 1 ft	Anthracene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Pyrene	0.0012	mg/kg	0.00088	0.00088	0.00088		Q
BG03-SS06-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Benzo(b)fluoranthene	0.0015	mg/kg	0.00088	0.00088	0.00088		
BG03-SS06-01	0 - 1 ft	Fluoranthene	0.0012	mg/kg	0.00088	0.00088	0.00088		
BG03-SS06-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Acenaphthylene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Chrysene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Benzo(a)pyrene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Benzo(a)anthracene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		UQ
BG03-SS06-01	0 - 1 ft	Acenaphthene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Phenanthrene	0.0013	mg/kg	0.00088	0.00088	0.00088	J+	Q
BG03-SS06-01	0 - 1 ft	Fluorene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		UQ
BG03-SS06-01	0 - 1 ft	1-Methylnaphthalene	< 0.00088	mg/kg	0.00088	0.00088	0.00088		U
BG03-SS06-01	0 - 1 ft	Naphthalene	0.0011	mg/kg	0.00088	0.00088	0.00088		
BG03-SS06-01	0 - 1 ft	2-Methylnaphthalene	0.0012	mg/kg	0.00088	0.00088	0.00088		
BG03-SS07-01	0 - 1 ft	Aluminum	9300	mg/kg	390	58	150		
BG03-SS07-01	0 - 1 ft	Iron (Fe)	11000	mg/kg	1200	240	390		
BG03-SS07-01	0 - 1 ft	Lead	3.9	mg/kg	3.9	0.48	0.77		J
BG03-SS07-01	0 - 1 ft	Magnesium (Mg)	820	mg/kg	39	2.7	3.9		
BG03-SS07-01	0 - 1 ft	Manganese (Mn)	94	mg/kg	0.77	0.14	0.19		
BG03-SS07-01	0 - 1 ft	Nickel	3.9	mg/kg	3.9	0.22	0.77		
BG03-SS07-01	0 - 1 ft	Potassium (K)	330	mg/kg	15	1.8	7.7		
BG03-SS07-01	0 - 1 ft	Silver	< 0.19	mg/kg	0.77	0.063	0.19		U
BG03-SS07-01	0 - 1 ft	Sodium (Na)	60	mg/kg	39	1.6	3.9		
BG03-SS07-01	0 - 1 ft	Antimony	1.2	mg/kg	0.77	0.29	0.39		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG03-SS07-01	0 - 1 ft	Arsenic	1.6	mg/kg	1.5	0.56	0.77		
BG03-SS07-01	0 - 1 ft	Barium	14	mg/kg	7.7	0.23	3.9		
BG03-SS07-01	0 - 1 ft	Beryllium	< 0.039	mg/kg	0.19	0.0098	0.039		U
BG03-SS07-01	0 - 1 ft	Cadmium	0.033	mg/kg	0.19	0.025	0.039	J	J
BG03-SS07-01	0 - 1 ft	Chromium	11	mg/kg	0.39	0.064	0.31		
BG03-SS07-01	0 - 1 ft	Cobalt	1.4	mg/kg	0.77	0.069	0.19		G
BG03-SS07-01	0 - 1 ft	Copper	22	mg/kg	3.9	0.32	0.77		
BG03-SS07-01	0 - 1 ft	Vanadium	18	mg/kg	1.9	0.098	0.77		
BG03-SS07-01	0 - 1 ft	Zinc	10	mg/kg	3.9	0.30	0.39		
BG03-SS07-01	0 - 1 ft	Calcium (Ca)	540	mg/kg	39	2.3	7.7		
BG03-SS07-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.5	0.90	1.2		U
BG03-SS07-01	0 - 1 ft	Thallium	0.068	mg/kg	0.16	0.038	0.039	J	J
BG03-SS07-01	0 - 1 ft	Anthracene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG03-SS07-01	0 - 1 ft	Pyrene	0.0049	mg/kg	0.00081	0.00081	0.00081		Q
BG03-SS07-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0013	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0012	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Benzo(b)fluoranthene	0.0048	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Fluoranthene	0.0048	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Benzo(k)fluoranthene	0.00095	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Acenaphthylene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG03-SS07-01	0 - 1 ft	Chrysene	0.0019	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Benzo(a)pyrene	0.0022	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG03-SS07-01	0 - 1 ft	Benzo(a)anthracene	0.0028	mg/kg	0.00081	0.00081	0.00081	J+	Q
BG03-SS07-01	0 - 1 ft	Acenaphthene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG03-SS07-01	0 - 1 ft	Phenanthrene	0.0037	mg/kg	0.00081	0.00081	0.00081	J+	Q
BG03-SS07-01	0 - 1 ft	Fluorene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		UQ
BG03-SS07-01	0 - 1 ft	1-Methylnaphthalene	0.0018	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	Naphthalene	0.0036	mg/kg	0.00081	0.00081	0.00081		
BG03-SS07-01	0 - 1 ft	2-Methylnaphthalene	0.0037	mg/kg	0.00081	0.00081	0.00081		
BG04-SB01-05	4 - 5 ft	Iron (Fe)	14000	mg/kg	120	25	41		
BG04-SB01-05	4 - 5 ft	Magnesium (Mg)	2400	mg/kg	410	28	41		
BG04-SB01-05	4 - 5 ft	Aluminum	15000	mg/kg	410	61	160		
BG04-SB01-05	4 - 5 ft	Lead	4.0	mg/kg	4.1	0.51	0.81	J	J
BG04-SB01-05	4 - 5 ft	Manganese (Mn)	150	mg/kg	0.81	0.15	0.20		
BG04-SB01-05	4 - 5 ft	Nickel	7.6	mg/kg	4.1	0.23	0.81		
BG04-SB01-05	4 - 5 ft	Potassium (K)	1200	mg/kg	16	1.9	8.1		
BG04-SB01-05	4 - 5 ft	Silver	< 0.20	mg/kg	0.81	0.066	0.20		U
BG04-SB01-05	4 - 5 ft	Sodium (Na)	83	mg/kg	41	1.7	4.1		
BG04-SB01-05	4 - 5 ft	Antimony	2.8	mg/kg	0.81	0.31	0.41		
BG04-SB01-05	4 - 5 ft	Arsenic	3.3	mg/kg	1.6	0.59	0.81		
BG04-SB01-05	4 - 5 ft	Barium	28	mg/kg	8.1	0.24	4.1		
BG04-SB01-05	4 - 5 ft	Beryllium	< 0.041	mg/kg	0.20	0.010	0.041		U
BG04-SB01-05	4 - 5 ft	Cadmium	< 0.041	mg/kg	0.20	0.027	0.041		U
BG04-SB01-05	4 - 5 ft	Chromium	18	mg/kg	0.41	0.067	0.33		
BG04-SB01-05	4 - 5 ft	Cobalt	2.9	mg/kg	0.81	0.073	0.20		
BG04-SB01-05	4 - 5 ft	Copper	33	mg/kg	4.1	0.34	0.81		
BG04-SB01-05	4 - 5 ft	Vanadium	23	mg/kg	2.0	0.10	0.81		
BG04-SB01-05	4 - 5 ft	Zinc	18	mg/kg	4.1	0.31	0.41		
BG04-SB01-05	4 - 5 ft	Calcium (Ca)	520	mg/kg	41	2.4	8.1		
BG04-SB01-05	4 - 5 ft	Selenium	< 1.2	mg/kg	1.6	0.95	1.2		U
BG04-SB01-05	4 - 5 ft	Thallium	0.14	mg/kg	0.16	0.039	0.040	J	J
BG04-SB01-05	4 - 5 ft	Anthracene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Pyrene	0.00081	mg/kg	0.00081	0.00081	0.00081		
BG04-SB01-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Fluoranthene	0.0011	mg/kg	0.00081	0.00081	0.00081		
BG04-SB01-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Acenaphthylene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Chrysene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Benzo(a)pyrene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Benzo(a)anthracene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Acenaphthene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Phenanthrene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Fluorene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	1-Methylnaphthalene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	Naphthalene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U
BG04-SB01-05	4 - 5 ft	2-Methylnaphthalene	< 0.00081	mg/kg	0.00081	0.00081	0.00081		U

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SB01-10	9 - 10 ft	Magnesium (Mg)	8800	mg/kg	380	26	38		
BG04-SB01-10	9 - 10 ft	Manganese (Mn)	530	mg/kg	7.5	1.4	1.9		
BG04-SB01-10	9 - 10 ft	Potassium (K)	6100	mg/kg	150	18	75		
BG04-SB01-10	9 - 10 ft	Vanadium	59	mg/kg	19	0.95	7.5		
BG04-SB01-10	9 - 10 ft	Calcium (Ca)	2500	mg/kg	380	22	75		
BG04-SB01-10	9 - 10 ft	Aluminum	29000	mg/kg	750	110	300		
BG04-SB01-10	9 - 10 ft	Iron (Fe)	36000	mg/kg	2300	470	750		
BG04-SB01-10	9 - 10 ft	Lead	5.3	mg/kg	3.8	0.47	0.75		
BG04-SB01-10	9 - 10 ft	Nickel	25	mg/kg	3.8	0.21	0.75		
BG04-SB01-10	9 - 10 ft	Silver	< 0.19	mg/kg	0.75	0.061	0.19		U
BG04-SB01-10	9 - 10 ft	Sodium (Na)	320	mg/kg	38	1.5	3.8		
BG04-SB01-10	9 - 10 ft	Antimony	9.8	mg/kg	0.75	0.28	0.38		
BG04-SB01-10	9 - 10 ft	Arsenic	3.5	mg/kg	1.5	0.55	0.75		
BG04-SB01-10	9 - 10 ft	Barium	140	mg/kg	7.5	0.22	3.8		
BG04-SB01-10	9 - 10 ft	Beryllium	0.18	mg/kg	0.19	0.0095	0.038	J	J
BG04-SB01-10	9 - 10 ft	Cadmium	0.067	mg/kg	0.19	0.025	0.038	J	J
BG04-SB01-10	9 - 10 ft	Chromium	41	mg/kg	0.38	0.062	0.30		
BG04-SB01-10	9 - 10 ft	Cobalt	9.8	mg/kg	0.75	0.068	0.19		
BG04-SB01-10	9 - 10 ft	Copper	76	mg/kg	3.8	0.31	0.75		
BG04-SB01-10	9 - 10 ft	Zinc	50	mg/kg	3.8	0.29	0.38		
BG04-SB01-10	9 - 10 ft	Selenium	< 1.1	mg/kg	1.5	0.87	1.1		U
BG04-SB01-10	9 - 10 ft	Thallium	0.45	mg/kg	0.16	0.039	0.040		
BG04-SB01-10	9 - 10 ft	Anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Acenaphthylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Chrysene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Benzo(a)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Benzo(a)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Acenaphthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Phenanthrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Fluorene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	1-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	Naphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB01-10	9 - 10 ft	2-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Magnesium (Mg)	2500	mg/kg	380	26	38	J+	
BG04-SB02-05	4 - 5 ft	Aluminum	17000	mg/kg	380	57	150	J+	
BG04-SB02-05	4 - 5 ft	Iron (Fe)	19000	mg/kg	1100	240	380	J+	
BG04-SB02-05	4 - 5 ft	Lead	5.8	mg/kg	3.8	0.47	0.75		
BG04-SB02-05	4 - 5 ft	Manganese (Mn)	160	mg/kg	0.75	0.14	0.19	J+	X
BG04-SB02-05	4 - 5 ft	Nickel	10	mg/kg	3.8	0.21	0.75	J+	X
BG04-SB02-05	4 - 5 ft	Potassium (K)	1100	mg/kg	15	1.8	7.5	J+	X
BG04-SB02-05	4 - 5 ft	Silver	< 0.19	mg/kg	0.75	0.062	0.19		U
BG04-SB02-05	4 - 5 ft	Sodium (Na)	91	mg/kg	38	1.5	3.8	J+	X
BG04-SB02-05	4 - 5 ft	Antimony	3.2	mg/kg	0.75	0.28	0.38		
BG04-SB02-05	4 - 5 ft	Arsenic	3.7	mg/kg	1.5	0.55	0.75		
BG04-SB02-05	4 - 5 ft	Barium	38	mg/kg	7.5	0.22	3.8	J+	X
BG04-SB02-05	4 - 5 ft	Beryllium	0.17	mg/kg	0.19	0.0096	0.038	J	J
BG04-SB02-05	4 - 5 ft	Cadmium	0.063	mg/kg	0.19	0.025	0.038	J	J
BG04-SB02-05	4 - 5 ft	Cobalt	3.4	mg/kg	0.75	0.068	0.19		
BG04-SB02-05	4 - 5 ft	Copper	38	mg/kg	3.8	0.31	0.75	J+	X
BG04-SB02-05	4 - 5 ft	Vanadium	27	mg/kg	1.9	0.096	0.75		
BG04-SB02-05	4 - 5 ft	Calcium (Ca)	620	mg/kg	38	2.2	7.5	J+	X
BG04-SB02-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.88	1.1	UJ	UX
BG04-SB02-05	4 - 5 ft	Chromium	19	mg/kg	0.38	0.062	0.30	J+	X
BG04-SB02-05	4 - 5 ft	Zinc	28	mg/kg	3.8	0.29	0.38	J+	X
BG04-SB02-05	4 - 5 ft	Thallium	0.096	mg/kg	0.16	0.038	0.039	J	J
BG04-SB02-05	4 - 5 ft	Anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Acenaphthylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SB02-05	4 - 5 ft	Chrysene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Benzo(a)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Benzo(a)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Acenaphthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Phenanthrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Fluorene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	1-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	Naphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-05	4 - 5 ft	2-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Magnesium (Mg)	5500	mg/kg	390	27	39		
BG04-SB02-10	9 - 10 ft	Manganese (Mn)	760	mg/kg	7.8	1.4	2.0		
BG04-SB02-10	9 - 10 ft	Potassium (K)	3800	mg/kg	160	18	78		
BG04-SB02-10	9 - 10 ft	Vanadium	56	mg/kg	20	0.99	7.8		
BG04-SB02-10	9 - 10 ft	Aluminum	19000	mg/kg	390	59	160		
BG04-SB02-10	9 - 10 ft	Iron (Fe)	30000	mg/kg	1200	240	390		
BG04-SB02-10	9 - 10 ft	Lead	4.9	mg/kg	3.9	0.49	0.78		
BG04-SB02-10	9 - 10 ft	Nickel	17	mg/kg	3.9	0.22	0.78		
BG04-SB02-10	9 - 10 ft	Silver	< 0.20	mg/kg	0.78	0.064	0.20		U
BG04-SB02-10	9 - 10 ft	Sodium (Na)	170	mg/kg	39	1.6	3.9		
BG04-SB02-10	9 - 10 ft	Antimony	9.7	mg/kg	0.78	0.29	0.39		
BG04-SB02-10	9 - 10 ft	Arsenic	5.0	mg/kg	1.6	0.57	0.78		
BG04-SB02-10	9 - 10 ft	Barium	75	mg/kg	7.8	0.23	3.9		
BG04-SB02-10	9 - 10 ft	Beryllium	0.63	mg/kg	0.20	0.0099	0.039		
BG04-SB02-10	9 - 10 ft	Cadmium	0.070	mg/kg	0.20	0.026	0.039	J	J
BG04-SB02-10	9 - 10 ft	Chromium	38	mg/kg	0.39	0.064	0.31		
BG04-SB02-10	9 - 10 ft	Cobalt	9.6	mg/kg	0.78	0.070	0.20		
BG04-SB02-10	9 - 10 ft	Copper	65	mg/kg	3.9	0.33	0.78		
BG04-SB02-10	9 - 10 ft	Zinc	34	mg/kg	3.9	0.30	0.39		
BG04-SB02-10	9 - 10 ft	Calcium (Ca)	1100	mg/kg	39	2.3	7.8		
BG04-SB02-10	9 - 10 ft	Selenium	< 1.2	mg/kg	1.6	0.91	1.2		U
BG04-SB02-10	9 - 10 ft	Thallium	0.31	mg/kg	0.15	0.037	0.039		
BG04-SB02-10	9 - 10 ft	Anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Acenaphthylene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Chrysene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Benzo(a)pyrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Benzo(a)anthracene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Acenaphthene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Phenanthrene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Fluorene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	1-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	Naphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB02-10	9 - 10 ft	2-Methylnaphthalene	< 0.00079	mg/kg	0.00079	0.00079	0.00079		U
BG04-SB03-05	4 - 5 ft	Magnesium (Mg)	8400	mg/kg	390	27	39		
BG04-SB03-05	4 - 5 ft	Manganese (Mn)	420	mg/kg	7.8	1.4	2.0		
BG04-SB03-05	4 - 5 ft	Potassium (K)	5700	mg/kg	160	18	78		
BG04-SB03-05	4 - 5 ft	Vanadium	60	mg/kg	20	0.99	7.8		
BG04-SB03-05	4 - 5 ft	Aluminum	31000	mg/kg	780	120	310		
BG04-SB03-05	4 - 5 ft	Iron (Fe)	38000	mg/kg	2300	490	780		
BG04-SB03-05	4 - 5 ft	Lead	5.3	mg/kg	3.9	0.49	0.78		
BG04-SB03-05	4 - 5 ft	Nickel	23	mg/kg	3.9	0.22	0.78		
BG04-SB03-05	4 - 5 ft	Silver	< 0.20	mg/kg	0.78	0.064	0.20		U
BG04-SB03-05	4 - 5 ft	Sodium (Na)	200	mg/kg	39	1.6	3.9		
BG04-SB03-05	4 - 5 ft	Antimony	8.4	mg/kg	0.78	0.29	0.39		
BG04-SB03-05	4 - 5 ft	Arsenic	4.0	mg/kg	1.6	0.57	0.78		
BG04-SB03-05	4 - 5 ft	Barium	110	mg/kg	7.8	0.23	3.9		
BG04-SB03-05	4 - 5 ft	Beryllium	0.34	mg/kg	0.20	0.0099	0.039		
BG04-SB03-05	4 - 5 ft	Cadmium	0.060	mg/kg	0.20	0.026	0.039	J	J
BG04-SB03-05	4 - 5 ft	Chromium	40	mg/kg	0.39	0.064	0.31		
BG04-SB03-05	4 - 5 ft	Cobalt	8.6	mg/kg	0.78	0.070	0.20		
BG04-SB03-05	4 - 5 ft	Copper	72	mg/kg	3.9	0.32	0.78		
BG04-SB03-05	4 - 5 ft	Zinc	45	mg/kg	3.9	0.30	0.39		
BG04-SB03-05	4 - 5 ft	Calcium (Ca)	1200	mg/kg	39	2.3	7.8		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SB03-05	4 - 5 ft	Selenium	< 1.2	mg/kg	1.6	0.91	1.2		U
BG04-SB03-05	4 - 5 ft	Thallium	0.43	mg/kg	0.15	0.036	0.037		
BG04-SB03-05	4 - 5 ft	Anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Acenaphthylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Chrysene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Benzo(a)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Benzo(a)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Acenaphthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Phenanthrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Fluorene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	1-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	Naphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-05	4 - 5 ft	2-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG04-SB03-10	9 - 10 ft	Magnesium (Mg)	7200	mg/kg	390	27	39		
BG04-SB03-10	9 - 10 ft	Manganese (Mn)	440	mg/kg	7.7	1.4	1.9		
BG04-SB03-10	9 - 10 ft	Potassium (K)	4500	mg/kg	150	18	77		
BG04-SB03-10	9 - 10 ft	Vanadium	52	mg/kg	19	0.98	7.7		
BG04-SB03-10	9 - 10 ft	Aluminum	27000	mg/kg	770	120	310		
BG04-SB03-10	9 - 10 ft	Iron (Fe)	29000	mg/kg	2300	480	770		
BG04-SB03-10	9 - 10 ft	Lead	5.4	mg/kg	3.9	0.48	0.77		
BG04-SB03-10	9 - 10 ft	Nickel	21	mg/kg	3.9	0.22	0.77		
BG04-SB03-10	9 - 10 ft	Silver	< 0.19	mg/kg	0.77	0.063	0.19		U
BG04-SB03-10	9 - 10 ft	Sodium (Na)	210	mg/kg	39	1.6	3.9		
BG04-SB03-10	9 - 10 ft	Antimony	9.0	mg/kg	0.77	0.29	0.39		
BG04-SB03-10	9 - 10 ft	Arsenic	2.5	mg/kg	1.5	0.56	0.77		
BG04-SB03-10	9 - 10 ft	Barium	110	mg/kg	7.7	0.23	3.9		
BG04-SB03-10	9 - 10 ft	Beryllium	0.099	mg/kg	0.19	0.0098	0.039	J	J
BG04-SB03-10	9 - 10 ft	Cadmium	0.036	mg/kg	0.19	0.026	0.039	J	J
BG04-SB03-10	9 - 10 ft	Chromium	36	mg/kg	0.39	0.064	0.31		
BG04-SB03-10	9 - 10 ft	Cobalt	9.1	mg/kg	0.77	0.070	0.19		
BG04-SB03-10	9 - 10 ft	Copper	64	mg/kg	3.9	0.32	0.77		
BG04-SB03-10	9 - 10 ft	Zinc	42	mg/kg	3.9	0.30	0.39		
BG04-SB03-10	9 - 10 ft	Calcium (Ca)	1400	mg/kg	39	2.3	7.7		
BG04-SB03-10	9 - 10 ft	Selenium	< 1.2	mg/kg	1.5	0.90	1.2		U
BG04-SB03-10	9 - 10 ft	Thallium	0.37	mg/kg	0.15	0.037	0.038		
BG04-SB03-10	9 - 10 ft	Anthracene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Pyrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Fluoranthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Acenaphthylene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Chrysene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Benzo(a)pyrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Benzo(a)anthracene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Acenaphthene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Phenanthrene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Fluorene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	1-Methylnaphthalene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	Naphthalene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB03-10	9 - 10 ft	2-Methylnaphthalene	< 0.00080	mg/kg	0.00080	0.00080	0.00080		U
BG04-SB04-05	4 - 5 ft	Iron (Fe)	16000	mg/kg	110	23	37		
BG04-SB04-05	4 - 5 ft	Magnesium (Mg)	2100	mg/kg	370	26	37		
BG04-SB04-05	4 - 5 ft	Aluminum	12000	mg/kg	370	56	150		
BG04-SB04-05	4 - 5 ft	Lead	3.8	mg/kg	3.7	0.46	0.75		
BG04-SB04-05	4 - 5 ft	Manganese (Mn)	140	mg/kg	0.75	0.14	0.19		
BG04-SB04-05	4 - 5 ft	Nickel	6.3	mg/kg	3.7	0.21	0.75		
BG04-SB04-05	4 - 5 ft	Potassium (K)	790	mg/kg	15	1.7	7.5		
BG04-SB04-05	4 - 5 ft	Silver	< 0.19	mg/kg	0.75	0.061	0.19		U
BG04-SB04-05	4 - 5 ft	Sodium (Na)	66	mg/kg	37	1.5	3.7		
BG04-SB04-05	4 - 5 ft	Antimony	2.7	mg/kg	0.75	0.28	0.37		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SB04-05	4 - 5 ft	Arsenic	3.2	mg/kg	1.5	0.54	0.75		
BG04-SB04-05	4 - 5 ft	Barium	24	mg/kg	7.5	0.22	3.7		
BG04-SB04-05	4 - 5 ft	Beryllium	< 0.037	mg/kg	0.19	0.0094	0.037	UJ	U
BG04-SB04-05	4 - 5 ft	Cadmium	0.032	mg/kg	0.19	0.025	0.037	J	J
BG04-SB04-05	4 - 5 ft	Chromium	17	mg/kg	0.37	0.061	0.30		
BG04-SB04-05	4 - 5 ft	Cobalt	2.8	mg/kg	0.75	0.067	0.19		
BG04-SB04-05	4 - 5 ft	Copper	35	mg/kg	3.7	0.31	0.75		
BG04-SB04-05	4 - 5 ft	Vanadium	23	mg/kg	1.9	0.095	0.75		
BG04-SB04-05	4 - 5 ft	Zinc	18	mg/kg	3.7	0.29	0.37		
BG04-SB04-05	4 - 5 ft	Calcium (Ca)	610	mg/kg	37	2.2	7.5		
BG04-SB04-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.87	1.1		U
BG04-SB04-05	4 - 5 ft	Thallium	0.11	mg/kg	0.15	0.037	0.039	J	J
BG04-SB04-05	4 - 5 ft	Anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Acenaphthylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Chrysene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Benzo(a)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Benzo(a)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Acenaphthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Phenanthrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		UG
BG04-SB04-05	4 - 5 ft	Fluorene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	1-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	Naphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05	4 - 5 ft	2-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG04-SB04-05 DUP	4 - 5 ft	Iron (Fe)	11000	mg/kg	110	24	38		
BG04-SB04-05 DUP	4 - 5 ft	Magnesium (Mg)	2100	mg/kg	380	26	38		
BG04-SB04-05 DUP	4 - 5 ft	Aluminum	10000	mg/kg	380	56	150		
BG04-SB04-05 DUP	4 - 5 ft	Lead	3.4	mg/kg	3.8	0.47	0.75	J	J
BG04-SB04-05 DUP	4 - 5 ft	Manganese (Mn)	120	mg/kg	0.75	0.14	0.19		
BG04-SB04-05 DUP	4 - 5 ft	Nickel	6.8	mg/kg	3.8	0.21	0.75		
BG04-SB04-05 DUP	4 - 5 ft	Potassium (K)	840	mg/kg	15	1.8	7.5		
BG04-SB04-05 DUP	4 - 5 ft	Silver	< 0.19	mg/kg	0.75	0.062	0.19		U
BG04-SB04-05 DUP	4 - 5 ft	Sodium (Na)	66	mg/kg	38	1.5	3.8		
BG04-SB04-05 DUP	4 - 5 ft	Antimony	2.5	mg/kg	0.75	0.28	0.38		
BG04-SB04-05 DUP	4 - 5 ft	Arsenic	2.5	mg/kg	1.5	0.55	0.75		
BG04-SB04-05 DUP	4 - 5 ft	Barium	21	mg/kg	7.5	0.22	3.8		
BG04-SB04-05 DUP	4 - 5 ft	Beryllium	0.039	mg/kg	0.19	0.0095	0.038	J	J
BG04-SB04-05 DUP	4 - 5 ft	Cadmium	0.037	mg/kg	0.19	0.025	0.038	J	J
BG04-SB04-05 DUP	4 - 5 ft	Cobalt	2.6	mg/kg	0.75	0.068	0.19		
BG04-SB04-05 DUP	4 - 5 ft	Copper	27	mg/kg	3.8	0.31	0.75		
BG04-SB04-05 DUP	4 - 5 ft	Vanadium	19	mg/kg	1.9	0.095	0.75		
BG04-SB04-05 DUP	4 - 5 ft	Calcium (Ca)	620	mg/kg	38	2.2	7.5		
BG04-SB04-05 DUP	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.88	1.1		U
BG04-SB04-05 DUP	4 - 5 ft	Chromium	13	mg/kg	0.38	0.062	0.30		
BG04-SB04-05 DUP	4 - 5 ft	Zinc	16	mg/kg	3.8	0.29	0.38		
BG04-SB04-05 DUP	4 - 5 ft	Thallium	0.081	mg/kg	0.15	0.035	0.036	J	J
BG04-SB04-05 DUP	4 - 5 ft	Anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Benzo(b)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Benzo(k)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Acenaphthylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Chrysene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Benzo(a)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Benzo(a)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Acenaphthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Phenanthrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UG
BG04-SB04-05 DUP	4 - 5 ft	Fluorene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	1-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	Naphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG04-SB04-05 DUP	4 - 5 ft	2-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SB04-10	9 - 10 ft	Aluminum	3000	mg/kg	350	53	140		
BG04-SB04-10	9 - 10 ft	Iron (Fe)	5000	mg/kg	1100	220	350		
BG04-SB04-10	9 - 10 ft	Lead	0.87	mg/kg	3.5	0.44	0.70	J	J
BG04-SB04-10	9 - 10 ft	Magnesium (Mg)	560	mg/kg	35	2.5	3.5		
BG04-SB04-10	9 - 10 ft	Manganese (Mn)	65	mg/kg	0.70	0.13	0.18		
BG04-SB04-10	9 - 10 ft	Nickel	2.2	mg/kg	3.5	0.20	0.70	J	J
BG04-SB04-10	9 - 10 ft	Potassium (K)	330	mg/kg	14	1.6	7.0		
BG04-SB04-10	9 - 10 ft	Silver	< 0.18	mg/kg	0.70	0.057	0.18		U
BG04-SB04-10	9 - 10 ft	Sodium (Na)	55	mg/kg	35	1.4	3.5		
BG04-SB04-10	9 - 10 ft	Antimony	1.4	mg/kg	0.70	0.26	0.35		
BG04-SB04-10	9 - 10 ft	Arsenic	0.74	mg/kg	1.4	0.51	0.70	J	J
BG04-SB04-10	9 - 10 ft	Barium	12	mg/kg	7.0	0.21	3.5		
BG04-SB04-10	9 - 10 ft	Beryllium	0.063	mg/kg	0.18	0.0089	0.035	J	J
BG04-SB04-10	9 - 10 ft	Cadmium	< 0.035	mg/kg	0.18	0.023	0.035		U
BG04-SB04-10	9 - 10 ft	Cobalt	1.4	mg/kg	0.70	0.063	0.18		
BG04-SB04-10	9 - 10 ft	Copper	11	mg/kg	3.5	0.29	0.70		
BG04-SB04-10	9 - 10 ft	Vanadium	7.4	mg/kg	1.8	0.089	0.70		
BG04-SB04-10	9 - 10 ft	Calcium (Ca)	250	mg/kg	35	2.1	7.0		
BG04-SB04-10	9 - 10 ft	Selenium	< 1.1	mg/kg	1.4	0.82	1.1		U
BG04-SB04-10	9 - 10 ft	Chromium	3.6	mg/kg	0.35	0.058	0.28		
BG04-SB04-10	9 - 10 ft	Zinc	< 0.35	mg/kg	3.5	0.27	0.35	U	
BG04-SB04-10	9 - 10 ft	Thallium	0.053	mg/kg	0.14	0.034	0.035	J	J
BG04-SB04-10	9 - 10 ft	Anthracene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Pyrene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Fluoranthene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Acenaphthylene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Chrysene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Benzo(a)pyrene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Benzo(a)anthracene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Acenaphthene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Phenanthrene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		UG
BG04-SB04-10	9 - 10 ft	Fluorene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	1-Methylnaphthalene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	Naphthalene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SB04-10	9 - 10 ft	2-Methylnaphthalene	< 0.00071	mg/kg	0.00071	0.00071	0.00071		U
BG04-SS01-01	0 - 1 ft	Aluminum	17000	mg/kg	400	60	160		
BG04-SS01-01	0 - 1 ft	Iron (Fe)	16000	mg/kg	1200	250	400		
BG04-SS01-01	0 - 1 ft	Lead	7.7	mg/kg	4.0	0.50	0.81		
BG04-SS01-01	0 - 1 ft	Magnesium (Mg)	1900	mg/kg	40	2.8	4.0		
BG04-SS01-01	0 - 1 ft	Manganese (Mn)	150	mg/kg	0.81	0.15	0.20		
BG04-SS01-01	0 - 1 ft	Nickel	7.9	mg/kg	4.0	0.23	0.81		
BG04-SS01-01	0 - 1 ft	Potassium (K)	710	mg/kg	16	1.9	8.1		
BG04-SS01-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.81	0.066	0.20		U
BG04-SS01-01	0 - 1 ft	Sodium (Na)	71	mg/kg	40	1.6	4.0		
BG04-SS01-01	0 - 1 ft	Antimony	2.5	mg/kg	0.81	0.30	0.40		
BG04-SS01-01	0 - 1 ft	Arsenic	3.5	mg/kg	1.6	0.58	0.81		
BG04-SS01-01	0 - 1 ft	Barium	35	mg/kg	8.1	0.24	4.0		
BG04-SS01-01	0 - 1 ft	Beryllium	0.19	mg/kg	0.20	0.010	0.040	J	J
BG04-SS01-01	0 - 1 ft	Cadmium	0.046	mg/kg	0.20	0.027	0.040	J	J
BG04-SS01-01	0 - 1 ft	Cobalt	2.7	mg/kg	0.81	0.072	0.20		
BG04-SS01-01	0 - 1 ft	Copper	32	mg/kg	4.0	0.33	0.81		
BG04-SS01-01	0 - 1 ft	Vanadium	24	mg/kg	2.0	0.10	0.81		
BG04-SS01-01	0 - 1 ft	Calcium (Ca)	490	mg/kg	40	2.4	8.1		
BG04-SS01-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.94	1.2		U
BG04-SS01-01	0 - 1 ft	Chromium	16	mg/kg	0.40	0.066	0.32		
BG04-SS01-01	0 - 1 ft	Zinc	20	mg/kg	4.0	0.31	0.40		
BG04-SS01-01	0 - 1 ft	Thallium	0.12	mg/kg	0.16	0.038	0.039	J	J
BG04-SS01-01	0 - 1 ft	Anthracene	0.015	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Pyrene	0.12	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Benzo(g,h,i)perylene	0.031	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.031	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Benzo(b)fluoranthene	0.071	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Fluoranthene	0.15	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Benzo(k)fluoranthene	0.030	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Acenaphthylene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SS01-01	0 - 1 ft	Chrysene	0.058	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Benzo(a)pyrene	0.049	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U
BG04-SS01-01	0 - 1 ft	Benzo(a)anthracene	0.058	mg/kg	0.0079	0.0079	0.0079		
BG04-SS01-01	0 - 1 ft	Acenaphthene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U
BG04-SS01-01	0 - 1 ft	Phenanthrene	0.083	mg/kg	0.0079	0.0079	0.0079		G
BG04-SS01-01	0 - 1 ft	Fluorene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U
BG04-SS01-01	0 - 1 ft	1-Methylnaphthalene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U
BG04-SS01-01	0 - 1 ft	Naphthalene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U
BG04-SS01-01	0 - 1 ft	2-Methylnaphthalene	< 0.0079	mg/kg	0.0079	0.0079	0.0079		U
BG04-SS02-01	0 - 1 ft	Iron (Fe)	13000	mg/kg	120	25	39		
BG04-SS02-01	0 - 1 ft	Magnesium (Mg)	2900	mg/kg	390	28	39		
BG04-SS02-01	0 - 1 ft	Aluminum	15000	mg/kg	390	59	160		
BG04-SS02-01	0 - 1 ft	Lead	6.2	mg/kg	3.9	0.49	0.79		
BG04-SS02-01	0 - 1 ft	Manganese (Mn)	180	mg/kg	0.79	0.15	0.20		
BG04-SS02-01	0 - 1 ft	Nickel	12	mg/kg	3.9	0.22	0.79		
BG04-SS02-01	0 - 1 ft	Potassium (K)	940	mg/kg	16	1.8	7.9		
BG04-SS02-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.79	0.064	0.20		U
BG04-SS02-01	0 - 1 ft	Sodium (Na)	200	mg/kg	39	1.6	3.9		
BG04-SS02-01	0 - 1 ft	Antimony	3.2	mg/kg	0.79	0.30	0.39		
BG04-SS02-01	0 - 1 ft	Arsenic	2.4	mg/kg	1.6	0.57	0.79		
BG04-SS02-01	0 - 1 ft	Barium	32	mg/kg	7.9	0.23	3.9		
BG04-SS02-01	0 - 1 ft	Beryllium	0.086	mg/kg	0.20	0.010	0.039	J	J
BG04-SS02-01	0 - 1 ft	Cadmium	0.031	mg/kg	0.20	0.026	0.039	J	J
BG04-SS02-01	0 - 1 ft	Cobalt	3.4	mg/kg	0.79	0.071	0.20		
BG04-SS02-01	0 - 1 ft	Copper	31	mg/kg	3.9	0.33	0.79		
BG04-SS02-01	0 - 1 ft	Vanadium	24	mg/kg	2.0	0.10	0.79		
BG04-SS02-01	0 - 1 ft	Calcium (Ca)	1700	mg/kg	39	2.3	7.9		
BG04-SS02-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.92	1.2		U
BG04-SS02-01	0 - 1 ft	Chromium	30	mg/kg	0.39	0.065	0.32		
BG04-SS02-01	0 - 1 ft	Zinc	25	mg/kg	3.9	0.30	0.39		
BG04-SS02-01	0 - 1 ft	Thallium	0.15	mg/kg	0.16	0.038	0.039	J	J
BG04-SS02-01	0 - 1 ft	Anthracene	0.065	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Pyrene	0.41	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Benzo(g,h,i)perylene	0.10	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.10	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Benzo(b)fluoranthene	0.25	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Fluoranthene	0.54	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Benzo(k)fluoranthene	0.086	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Acenaphthylene	< 0.016	mg/kg	0.016	0.016	0.016		U
BG04-SS02-01	0 - 1 ft	Chrysene	0.20	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Benzo(a)pyrene	0.17	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.016	mg/kg	0.016	0.016	0.016		U
BG04-SS02-01	0 - 1 ft	Benzo(a)anthracene	0.22	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Acenaphthene	0.025	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	Phenanthrene	0.31	mg/kg	0.016	0.016	0.016		G
BG04-SS02-01	0 - 1 ft	Fluorene	0.024	mg/kg	0.016	0.016	0.016		
BG04-SS02-01	0 - 1 ft	1-Methylnaphthalene	< 0.016	mg/kg	0.016	0.016	0.016		U
BG04-SS02-01	0 - 1 ft	Naphthalene	< 0.016	mg/kg	0.016	0.016	0.016		U
BG04-SS02-01	0 - 1 ft	2-Methylnaphthalene	< 0.016	mg/kg	0.016	0.016	0.016		U
BG04-SS03-01	0 - 1 ft	Aluminum	16000	mg/kg	410	61	160		
BG04-SS03-01	0 - 1 ft	Iron (Fe)	18000	mg/kg	1200	260	410		
BG04-SS03-01	0 - 1 ft	Lead	4.6	mg/kg	4.1	0.51	0.82		
BG04-SS03-01	0 - 1 ft	Magnesium (Mg)	1500	mg/kg	41	2.9	4.1		
BG04-SS03-01	0 - 1 ft	Manganese (Mn)	120	mg/kg	0.82	0.15	0.20		
BG04-SS03-01	0 - 1 ft	Nickel	7.3	mg/kg	4.1	0.23	0.82		
BG04-SS03-01	0 - 1 ft	Potassium (K)	550	mg/kg	16	1.9	8.2		
BG04-SS03-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.82	0.067	0.20		U
BG04-SS03-01	0 - 1 ft	Sodium (Na)	65	mg/kg	41	1.7	4.1		
BG04-SS03-01	0 - 1 ft	Antimony	2.0	mg/kg	0.82	0.31	0.41		
BG04-SS03-01	0 - 1 ft	Arsenic	3.1	mg/kg	1.6	0.59	0.82		
BG04-SS03-01	0 - 1 ft	Barium	32	mg/kg	8.2	0.24	4.1		
BG04-SS03-01	0 - 1 ft	Beryllium	0.23	mg/kg	0.20	0.010	0.041		
BG04-SS03-01	0 - 1 ft	Cadmium	0.034	mg/kg	0.20	0.027	0.041	J	J
BG04-SS03-01	0 - 1 ft	Cobalt	2.2	mg/kg	0.82	0.074	0.20		
BG04-SS03-01	0 - 1 ft	Copper	33	mg/kg	4.1	0.34	0.82		
BG04-SS03-01	0 - 1 ft	Vanadium	23	mg/kg	2.0	0.10	0.82		
BG04-SS03-01	0 - 1 ft	Calcium (Ca)	560	mg/kg	41	2.4	8.2		
BG04-SS03-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.95	1.2		U
BG04-SS03-01	0 - 1 ft	Chromium	13	mg/kg	0.41	0.067	0.33		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SS03-01	0 - 1 ft	Zinc	22	mg/kg	4.1	0.32	0.41		
BG04-SS03-01	0 - 1 ft	Thallium	0.11	mg/kg	0.17	0.040	0.041	J	J
BG04-SS03-01	0 - 1 ft	Anthracene	0.0064	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Pyrene	0.053	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Benzo(g,h,i)perylene	0.013	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.013	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Benzo(b)fluoranthene	0.030	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Fluoranthene	0.069	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Benzo(k)fluoranthene	0.016	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Acenaphthylene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS03-01	0 - 1 ft	Chrysene	0.026	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Benzo(a)pyrene	0.022	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS03-01	0 - 1 ft	Benzo(a)anthracene	0.026	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Acenaphthene	0.0034	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	Phenanthrene	0.043	mg/kg	0.0025	0.0025	0.0025		G
BG04-SS03-01	0 - 1 ft	Fluorene	0.0032	mg/kg	0.0025	0.0025	0.0025		
BG04-SS03-01	0 - 1 ft	1-Methylnaphthalene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS03-01	0 - 1 ft	Naphthalene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS03-01	0 - 1 ft	2-Methylnaphthalene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS04-01	0 - 1 ft	Iron (Fe)	20000	mg/kg	1200	250	400		
BG04-SS04-01	0 - 1 ft	Aluminum	21000	mg/kg	790	120	320		
BG04-SS04-01	0 - 1 ft	Lead	5.3	mg/kg	4.0	0.49	0.79		
BG04-SS04-01	0 - 1 ft	Magnesium (Mg)	1800	mg/kg	40	2.8	4.0		
BG04-SS04-01	0 - 1 ft	Manganese (Mn)	130	mg/kg	0.79	0.15	0.20		
BG04-SS04-01	0 - 1 ft	Nickel	8.8	mg/kg	4.0	0.22	0.79		
BG04-SS04-01	0 - 1 ft	Potassium (K)	670	mg/kg	16	1.8	7.9		
BG04-SS04-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.79	0.065	0.20		U
BG04-SS04-01	0 - 1 ft	Sodium (Na)	74	mg/kg	40	1.6	4.0		
BG04-SS04-01	0 - 1 ft	Antimony	2.5	mg/kg	0.79	0.30	0.40		
BG04-SS04-01	0 - 1 ft	Arsenic	4.3	mg/kg	1.6	0.57	0.79		
BG04-SS04-01	0 - 1 ft	Barium	37	mg/kg	7.9	0.24	4.0		
BG04-SS04-01	0 - 1 ft	Beryllium	0.18	mg/kg	0.20	0.010	0.040	J	J
BG04-SS04-01	0 - 1 ft	Cadmium	< 0.040	mg/kg	0.20	0.026	0.040		U
BG04-SS04-01	0 - 1 ft	Cobalt	2.6	mg/kg	0.79	0.071	0.20		
BG04-SS04-01	0 - 1 ft	Copper	34	mg/kg	4.0	0.33	0.79		
BG04-SS04-01	0 - 1 ft	Vanadium	26	mg/kg	2.0	0.10	0.79		
BG04-SS04-01	0 - 1 ft	Calcium (Ca)	600	mg/kg	40	2.3	7.9		
BG04-SS04-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.92	1.2		U
BG04-SS04-01	0 - 1 ft	Chromium	16	mg/kg	0.40	0.065	0.32		
BG04-SS04-01	0 - 1 ft	Zinc	24	mg/kg	4.0	0.31	0.40		
BG04-SS04-01	0 - 1 ft	Thallium	0.12	mg/kg	0.15	0.037	0.038	J	J
BG04-SS04-01	0 - 1 ft	Anthracene	0.0029	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Pyrene	0.016	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0045	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0045	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Benzo(b)fluoranthene	0.0095	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Fluoranthene	0.021	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Benzo(k)fluoranthene	0.0041	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Acenaphthylene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS04-01	0 - 1 ft	Chrysene	0.0074	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Benzo(a)pyrene	0.0069	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS04-01	0 - 1 ft	Benzo(a)anthracene	0.0088	mg/kg	0.0024	0.0024	0.0024		
BG04-SS04-01	0 - 1 ft	Acenaphthene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS04-01	0 - 1 ft	Phenanthrene	0.012	mg/kg	0.0024	0.0024	0.0024		G
BG04-SS04-01	0 - 1 ft	Fluorene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS04-01	0 - 1 ft	1-Methylnaphthalene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS04-01	0 - 1 ft	Naphthalene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS04-01	0 - 1 ft	2-Methylnaphthalene	< 0.0024	mg/kg	0.0024	0.0024	0.0024		U
BG04-SS05-01	0 - 1 ft	Aluminum	19000	mg/kg	400	61	160		
BG04-SS05-01	0 - 1 ft	Iron (Fe)	20000	mg/kg	1200	250	400		
BG04-SS05-01	0 - 1 ft	Lead	6.4	mg/kg	4.0	0.50	0.81		
BG04-SS05-01	0 - 1 ft	Magnesium (Mg)	1600	mg/kg	40	2.8	4.0		
BG04-SS05-01	0 - 1 ft	Manganese (Mn)	130	mg/kg	0.81	0.15	0.20		
BG04-SS05-01	0 - 1 ft	Nickel	7.9	mg/kg	4.0	0.23	0.81		
BG04-SS05-01	0 - 1 ft	Potassium (K)	660	mg/kg	16	1.9	8.1		
BG04-SS05-01	0 - 1 ft	Silver	< 0.20	mg/kg	0.81	0.066	0.20		U
BG04-SS05-01	0 - 1 ft	Sodium (Na)	77	mg/kg	40	1.7	4.0		
BG04-SS05-01	0 - 1 ft	Antimony	2.1	mg/kg	0.81	0.30	0.40		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SS05-01	0 - 1 ft	Arsenic	4.6	mg/kg	1.6	0.59	0.81		
BG04-SS05-01	0 - 1 ft	Barium	34	mg/kg	8.1	0.24	4.0		
BG04-SS05-01	0 - 1 ft	Beryllium	0.24	mg/kg	0.20	0.010	0.040		
BG04-SS05-01	0 - 1 ft	Cadmium	< 0.040	mg/kg	0.20	0.027	0.040		U
BG04-SS05-01	0 - 1 ft	Cobalt	2.3	mg/kg	0.81	0.073	0.20		
BG04-SS05-01	0 - 1 ft	Copper	38	mg/kg	4.0	0.34	0.81		
BG04-SS05-01	0 - 1 ft	Vanadium	26	mg/kg	2.0	0.10	0.81		
BG04-SS05-01	0 - 1 ft	Calcium (Ca)	440	mg/kg	40	2.4	8.1		
BG04-SS05-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.6	0.94	1.2		U
BG04-SS05-01	0 - 1 ft	Chromium	15	mg/kg	0.40	0.067	0.32		
BG04-SS05-01	0 - 1 ft	Zinc	21	mg/kg	4.0	0.31	0.40		
BG04-SS05-01	0 - 1 ft	Thallium	0.13	mg/kg	0.16	0.038	0.039	J	J
BG04-SS05-01	0 - 1 ft	Anthracene	0.0059	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Pyrene	0.045	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Benzo(g,h,i)perylene	0.011	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS05-01	0 - 1 ft	Benzo(b)fluoranthene	0.031	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Fluoranthene	0.060	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Benzo(k)fluoranthene	0.0083	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Acenaphthylene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS05-01	0 - 1 ft	Chrysene	0.020	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Benzo(a)pyrene	0.020	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS05-01	0 - 1 ft	Benzo(a)anthracene	0.024	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Acenaphthene	0.0029	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	Phenanthrene	0.035	mg/kg	0.0025	0.0025	0.0025		G
BG04-SS05-01	0 - 1 ft	Fluorene	0.0027	mg/kg	0.0025	0.0025	0.0025		
BG04-SS05-01	0 - 1 ft	1-Methylnaphthalene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS05-01	0 - 1 ft	Naphthalene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS05-01	0 - 1 ft	2-Methylnaphthalene	< 0.0025	mg/kg	0.0025	0.0025	0.0025		U
BG04-SS06-01	0 - 1 ft	Aluminum	16000	mg/kg	420	63	170		
BG04-SS06-01	0 - 1 ft	Iron (Fe)	17000	mg/kg	1300	260	420		
BG04-SS06-01	0 - 1 ft	Lead	7.1	mg/kg	4.2	0.52	0.84		
BG04-SS06-01	0 - 1 ft	Magnesium (Mg)	1500	mg/kg	42	2.9	4.2		
BG04-SS06-01	0 - 1 ft	Manganese (Mn)	110	mg/kg	0.84	0.16	0.21		
BG04-SS06-01	0 - 1 ft	Nickel	7.0	mg/kg	4.2	0.24	0.84		
BG04-SS06-01	0 - 1 ft	Potassium (K)	580	mg/kg	17	2.0	8.4		
BG04-SS06-01	0 - 1 ft	Silver	< 0.21	mg/kg	0.84	0.069	0.21		U
BG04-SS06-01	0 - 1 ft	Sodium (Na)	80	mg/kg	42	1.7	4.2		
BG04-SS06-01	0 - 1 ft	Antimony	1.5	mg/kg	0.84	0.32	0.42		
BG04-SS06-01	0 - 1 ft	Arsenic	2.9	mg/kg	1.7	0.61	0.84		
BG04-SS06-01	0 - 1 ft	Barium	29	mg/kg	8.4	0.25	4.2		
BG04-SS06-01	0 - 1 ft	Beryllium	0.17	mg/kg	0.21	0.011	0.042	J	J
BG04-SS06-01	0 - 1 ft	Cadmium	0.059	mg/kg	0.21	0.028	0.042	J	J
BG04-SS06-01	0 - 1 ft	Cobalt	1.7	mg/kg	0.84	0.076	0.21		
BG04-SS06-01	0 - 1 ft	Copper	34	mg/kg	4.2	0.35	0.84		
BG04-SS06-01	0 - 1 ft	Vanadium	24	mg/kg	2.1	0.11	0.84		
BG04-SS06-01	0 - 1 ft	Calcium (Ca)	460	mg/kg	42	2.5	8.4		
BG04-SS06-01	0 - 1 ft	Selenium	< 1.3	mg/kg	1.7	0.98	1.3		U
BG04-SS06-01	0 - 1 ft	Chromium	14	mg/kg	0.42	0.069	0.34		
BG04-SS06-01	0 - 1 ft	Zinc	22	mg/kg	4.2	0.33	0.42		
BG04-SS06-01	0 - 1 ft	Thallium	0.11	mg/kg	0.17	0.041	0.042	J	J
BG04-SS06-01	0 - 1 ft	Anthracene	0.0050	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Pyrene	0.053	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Benzo(g,h,i)perylene	0.013	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.013	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Benzo(b)fluoranthene	0.036	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Fluoranthene	0.072	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Benzo(k)fluoranthene	0.013	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Acenaphthylene	< 0.0026	mg/kg	0.0026	0.0026	0.0026		U
BG04-SS06-01	0 - 1 ft	Chrysene	0.025	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Benzo(a)pyrene	0.023	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.0026	mg/kg	0.0026	0.0026	0.0026		U
BG04-SS06-01	0 - 1 ft	Benzo(a)anthracene	0.026	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Acenaphthene	0.0037	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Phenanthrene	0.044	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	Fluorene	0.0037	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	1-Methylnaphthalene	0.0063	mg/kg	0.0026	0.0026	0.0026		Y
BG04-SS06-01	0 - 1 ft	Naphthalene	0.0048	mg/kg	0.0026	0.0026	0.0026		
BG04-SS06-01	0 - 1 ft	2-Methylnaphthalene	0.0068	mg/kg	0.0026	0.0026	0.0026		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG04-SS07-01	0 - 1 ft	Aluminum	14000	mg/kg	420	63	170		
BG04-SS07-01	0 - 1 ft	Iron (Fe)	16000	mg/kg	1300	260	420		
BG04-SS07-01	0 - 1 ft	Lead	10	mg/kg	4.2	0.52	0.84		
BG04-SS07-01	0 - 1 ft	Magnesium (Mg)	1400	mg/kg	42	2.9	4.2		
BG04-SS07-01	0 - 1 ft	Manganese (Mn)	130	mg/kg	0.84	0.16	0.21		
BG04-SS07-01	0 - 1 ft	Nickel	6.2	mg/kg	4.2	0.24	0.84		
BG04-SS07-01	0 - 1 ft	Potassium (K)	590	mg/kg	17	2.0	8.4		
BG04-SS07-01	0 - 1 ft	Silver	< 0.21	mg/kg	0.84	0.069	0.21		U
BG04-SS07-01	0 - 1 ft	Sodium (Na)	100	mg/kg	42	1.7	4.2		
BG04-SS07-01	0 - 1 ft	Antimony	1.2	mg/kg	0.84	0.32	0.42		
BG04-SS07-01	0 - 1 ft	Arsenic	3.3	mg/kg	1.7	0.61	0.84		
BG04-SS07-01	0 - 1 ft	Barium	38	mg/kg	8.4	0.25	4.2		
BG04-SS07-01	0 - 1 ft	Beryllium	0.14	mg/kg	0.21	0.011	0.042	J	J
BG04-SS07-01	0 - 1 ft	Cadmium	0.091	mg/kg	0.21	0.028	0.042	J	J
BG04-SS07-01	0 - 1 ft	Cobalt	1.4	mg/kg	0.84	0.076	0.21		
BG04-SS07-01	0 - 1 ft	Copper	35	mg/kg	4.2	0.35	0.84		
BG04-SS07-01	0 - 1 ft	Vanadium	25	mg/kg	2.1	0.11	0.84		
BG04-SS07-01	0 - 1 ft	Calcium (Ca)	970	mg/kg	42	2.5	8.4		
BG04-SS07-01	0 - 1 ft	Selenium	< 1.3	mg/kg	1.7	0.98	1.3		U
BG04-SS07-01	0 - 1 ft	Chromium	11	mg/kg	0.42	0.069	0.34		
BG04-SS07-01	0 - 1 ft	Zinc	23	mg/kg	4.2	0.33	0.42		
BG04-SS07-01	0 - 1 ft	Thallium	0.098	mg/kg	0.17	0.041	0.043	J	J
BG04-SS07-01	0 - 1 ft	Anthracene	0.025	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Pyrene	0.21	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.0086	mg/kg	0.0086	0.0086	0.0086		U
BG04-SS07-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.049	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Benzo(b)fluoranthene	0.14	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Fluoranthene	0.27	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Benzo(k)fluoranthene	0.050	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Acenaphthylene	< 0.0086	mg/kg	0.0086	0.0086	0.0086		U
BG04-SS07-01	0 - 1 ft	Chrysene	0.097	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Benzo(a)pyrene	0.088	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.0086	mg/kg	0.0086	0.0086	0.0086		U
BG04-SS07-01	0 - 1 ft	Benzo(a)anthracene	0.10	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Acenaphthene	0.013	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Phenanthrene	0.16	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	Fluorene	0.012	mg/kg	0.0086	0.0086	0.0086		
BG04-SS07-01	0 - 1 ft	1-Methylnaphthalene	0.0086	mg/kg	0.0086	0.0086	0.0086		Y
BG04-SS07-01	0 - 1 ft	Naphthalene	< 0.0086	mg/kg	0.0086	0.0086	0.0086		U
BG04-SS07-01	0 - 1 ft	2-Methylnaphthalene	< 0.0086	mg/kg	0.0086	0.0086	0.0086		U
BG02-SB01-05	4 - 5 ft	Iron (Fe)	7800	mg/kg	110	24	38		
BG02-SB01-05	4 - 5 ft	Aluminum	5900	mg/kg	380	57	150		
BG02-SB01-05	4 - 5 ft	Lead	1.4	mg/kg	3.8	0.47	0.75	J	J
BG02-SB01-05	4 - 5 ft	Magnesium (Mg)	1300	mg/kg	38	2.6	3.8		
BG02-SB01-05	4 - 5 ft	Manganese (Mn)	120	mg/kg	0.75	0.14	0.19		
BG02-SB01-05	4 - 5 ft	Nickel	4.8	mg/kg	3.8	0.21	0.75		
BG02-SB01-05	4 - 5 ft	Silver	< 0.19	mg/kg	0.75	0.062	0.19		U
BG02-SB01-05	4 - 5 ft	Sodium (Na)	85	mg/kg	38	1.5	3.8		
BG02-SB01-05	4 - 5 ft	Antimony	2.4	mg/kg	0.75	0.28	0.38		
BG02-SB01-05	4 - 5 ft	Arsenic	2.0	mg/kg	1.5	0.55	0.75		
BG02-SB01-05	4 - 5 ft	Barium	15	mg/kg	7.5	0.22	3.8		
BG02-SB01-05	4 - 5 ft	Beryllium	0.13	mg/kg	0.19	0.0096	0.038	J	J
BG02-SB01-05	4 - 5 ft	Cadmium	< 0.038	mg/kg	0.19	0.025	0.038		U
BG02-SB01-05	4 - 5 ft	Chromium	9.2	mg/kg	0.38	0.062	0.30		
BG02-SB01-05	4 - 5 ft	Cobalt	2.6	mg/kg	0.75	0.068	0.19		
BG02-SB01-05	4 - 5 ft	Copper	22	mg/kg	3.8	0.31	0.75		
BG02-SB01-05	4 - 5 ft	Vanadium	11	mg/kg	1.9	0.096	0.75		
BG02-SB01-05	4 - 5 ft	Zinc	9.6	mg/kg	3.8	0.29	0.38		
BG02-SB01-05	4 - 5 ft	Calcium (Ca)	490	mg/kg	38	2.2	7.5		
BG02-SB01-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.88	1.1		U
BG02-SB01-05	4 - 5 ft	Potassium (K)	570	mg/kg	15	1.8	7.5		
BG02-SB01-05	4 - 5 ft	Thallium	0.056	mg/kg	0.15	0.037	0.038	J	J
BG02-SB01-05	4 - 5 ft	Anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Acenaphthylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SB01-05	4 - 5 ft	Chrysene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Benzo(a)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Benzo(a)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Acenaphthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Phenanthrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Fluorene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	1-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	Naphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-05	4 - 5 ft	2-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB01-06	5 - 6 ft	Iron (Fe)	9200	mg/kg	110	24	38		
BG02-SB01-06	5 - 6 ft	Manganese (Mn)	390	mg/kg	7.6	1.4	1.9		
BG02-SB01-06	5 - 6 ft	Aluminum	5600	mg/kg	380	57	150		
BG02-SB01-06	5 - 6 ft	Lead	1.8	mg/kg	3.8	0.47	0.76	J	J
BG02-SB01-06	5 - 6 ft	Magnesium (Mg)	850	mg/kg	38	2.6	3.8		
BG02-SB01-06	5 - 6 ft	Nickel	4.0	mg/kg	3.8	0.21	0.76		
BG02-SB01-06	5 - 6 ft	Silver	< 0.19	mg/kg	0.76	0.062	0.19		U
BG02-SB01-06	5 - 6 ft	Sodium (Na)	69	mg/kg	38	1.5	3.8		
BG02-SB01-06	5 - 6 ft	Antimony	2.1	mg/kg	0.76	0.28	0.38		
BG02-SB01-06	5 - 6 ft	Arsenic	1.7	mg/kg	1.5	0.55	0.76		
BG02-SB01-06	5 - 6 ft	Barium	16	mg/kg	7.6	0.22	3.8		
BG02-SB01-06	5 - 6 ft	Beryllium	0.13	mg/kg	0.19	0.0096	0.038	J	J
BG02-SB01-06	5 - 6 ft	Cadmium	0.035	mg/kg	0.19	0.025	0.038	J	J
BG02-SB01-06	5 - 6 ft	Chromium	8.8	mg/kg	0.38	0.062	0.30		
BG02-SB01-06	5 - 6 ft	Cobalt	2.2	mg/kg	0.76	0.068	0.19		
BG02-SB01-06	5 - 6 ft	Copper	23	mg/kg	3.8	0.31	0.76		
BG02-SB01-06	5 - 6 ft	Vanadium	13	mg/kg	1.9	0.096	0.76		
BG02-SB01-06	5 - 6 ft	Zinc	7.6	mg/kg	3.8	0.29	0.38		
BG02-SB01-06	5 - 6 ft	Calcium (Ca)	430	mg/kg	38	2.2	7.6		
BG02-SB01-06	5 - 6 ft	Selenium	< 1.1	mg/kg	1.5	0.88	1.1		U
BG02-SB01-06	5 - 6 ft	Potassium (K)	360	mg/kg	15	1.8	7.6		
BG02-SB01-06	5 - 6 ft	Thallium	0.054	mg/kg	0.14	0.035	0.036	J	J
BG02-SB01-06	5 - 6 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	Pyrene	0.0087	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Benzo(g,h,i)perylene	0.0031	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	Benzo(b)fluoranthene	0.0064	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Fluoranthene	0.0093	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Benzo(k)fluoranthene	0.0022	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	Chrysene	0.0036	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Benzo(a)pyrene	0.0038	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	Benzo(a)anthracene	0.0046	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	Phenanthrene	0.0058	mg/kg	0.00076	0.00076	0.00076		
BG02-SB01-06	5 - 6 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB01-06	5 - 6 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB02-05	4 - 5 ft	Iron (Fe)	6400	mg/kg	100	21	34	J-	
BG02-SB02-05	4 - 5 ft	Aluminum	4000	mg/kg	340	51	140	J+	
BG02-SB02-05	4 - 5 ft	Lead	1.2	mg/kg	3.4	0.42	0.68	J	J
BG02-SB02-05	4 - 5 ft	Magnesium (Mg)	920	mg/kg	34	2.4	3.4	J-	X
BG02-SB02-05	4 - 5 ft	Manganese (Mn)	120	mg/kg	0.68	0.13	0.17	J-	X
BG02-SB02-05	4 - 5 ft	Nickel	3.7	mg/kg	3.4	0.19	0.68		
BG02-SB02-05	4 - 5 ft	Silver	< 0.17	mg/kg	0.68	0.056	0.17		U
BG02-SB02-05	4 - 5 ft	Sodium (Na)	69	mg/kg	34	1.4	3.4		
BG02-SB02-05	4 - 5 ft	Antimony	1.9	mg/kg	0.68	0.26	0.34		
BG02-SB02-05	4 - 5 ft	Arsenic	1.1	mg/kg	1.4	0.49	0.68	J	J
BG02-SB02-05	4 - 5 ft	Barium	10	mg/kg	6.8	0.20	3.4		
BG02-SB02-05	4 - 5 ft	Beryllium	0.092	mg/kg	0.17	0.0086	0.034	J	J
BG02-SB02-05	4 - 5 ft	Cadmium	< 0.034	mg/kg	0.17	0.022	0.034		U
BG02-SB02-05	4 - 5 ft	Chromium	6.7	mg/kg	0.34	0.056	0.27		
BG02-SB02-05	4 - 5 ft	Cobalt	2.0	mg/kg	0.68	0.061	0.17		
BG02-SB02-05	4 - 5 ft	Copper	16	mg/kg	3.4	0.28	0.68		
BG02-SB02-05	4 - 5 ft	Vanadium	9.2	mg/kg	1.7	0.086	0.68		
BG02-SB02-05	4 - 5 ft	Zinc	6.7	mg/kg	3.4	0.26	0.34		
BG02-SB02-05	4 - 5 ft	Calcium (Ca)	490	mg/kg	34	2.0	6.8	J+	X
BG02-SB02-05	4 - 5 ft	Selenium	< 1.0	mg/kg	1.4	0.79	1.0		U

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SB02-05	4 - 5 ft	Potassium (K)	350	mg/kg	14	1.6	6.8		
BG02-SB02-05	4 - 5 ft	Thallium	0.051	mg/kg	0.14	0.033	0.034	J	J
BG02-SB02-05	4 - 5 ft	Anthracene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Pyrene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Fluoranthene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Acenaphthylene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Chrysene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Benzo(a)pyrene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Benzo(a)anthracene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		UX
BG02-SB02-05	4 - 5 ft	Acenaphthene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Phenanthrene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		UX
BG02-SB02-05	4 - 5 ft	Fluorene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	1-Methylnaphthalene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	Naphthalene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-05	4 - 5 ft	2-Methylnaphthalene	< 0.00069	mg/kg	0.00069	0.00069	0.00069		U
BG02-SB02-10	9 - 10 ft	Iron (Fe)	4400	mg/kg	120	24	39		
BG02-SB02-10	9 - 10 ft	Aluminum	2700	mg/kg	390	58	160		
BG02-SB02-10	9 - 10 ft	Lead	1.1	mg/kg	3.9	0.48	0.78	J	J
BG02-SB02-10	9 - 10 ft	Magnesium (Mg)	590	mg/kg	39	2.7	3.9		
BG02-SB02-10	9 - 10 ft	Manganese (Mn)	76	mg/kg	0.78	0.14	0.19		
BG02-SB02-10	9 - 10 ft	Nickel	2.8	mg/kg	3.9	0.22	0.78	J	J
BG02-SB02-10	9 - 10 ft	Silver	< 0.19	mg/kg	0.78	0.063	0.19		U
BG02-SB02-10	9 - 10 ft	Sodium (Na)	88	mg/kg	39	1.6	3.9		
BG02-SB02-10	9 - 10 ft	Antimony	1.5	mg/kg	0.78	0.29	0.39		
BG02-SB02-10	9 - 10 ft	Arsenic	< 0.78	mg/kg	1.6	0.56	0.78		U
BG02-SB02-10	9 - 10 ft	Barium	7.9	mg/kg	7.8	0.23	3.9		
BG02-SB02-10	9 - 10 ft	Beryllium	0.041	mg/kg	0.19	0.0098	0.039	J	J
BG02-SB02-10	9 - 10 ft	Cadmium	< 0.039	mg/kg	0.19	0.026	0.039		U
BG02-SB02-10	9 - 10 ft	Chromium	4.9	mg/kg	0.39	0.064	0.31		
BG02-SB02-10	9 - 10 ft	Cobalt	1.6	mg/kg	0.78	0.070	0.19		
BG02-SB02-10	9 - 10 ft	Copper	11	mg/kg	3.9	0.32	0.78		
BG02-SB02-10	9 - 10 ft	Vanadium	6.2	mg/kg	1.9	0.098	0.78		
BG02-SB02-10	9 - 10 ft	Zinc	5.2	mg/kg	3.9	0.30	0.39		
BG02-SB02-10	9 - 10 ft	Calcium (Ca)	480	mg/kg	39	2.3	7.8		
BG02-SB02-10	9 - 10 ft	Selenium	< 1.2	mg/kg	1.6	0.90	1.2		U
BG02-SB02-10	9 - 10 ft	Potassium (K)	320	mg/kg	16	1.8	7.8		
BG02-SB02-10	9 - 10 ft	Thallium	0.042	mg/kg	0.15	0.037	0.038	J	J
BG02-SB02-10	9 - 10 ft	Anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Acenaphthylene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Chrysene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Benzo(a)pyrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Benzo(a)anthracene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Acenaphthene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Phenanthrene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Fluorene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	1-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	Naphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB02-10	9 - 10 ft	2-Methylnaphthalene	< 0.00078	mg/kg	0.00078	0.00078	0.00078		U
BG02-SB03-05	4 - 5 ft	Iron (Fe)	13000	mg/kg	99	21	33		
BG02-SB03-05	4 - 5 ft	Aluminum	4300	mg/kg	330	50	130		
BG02-SB03-05	4 - 5 ft	Lead	1.8	mg/kg	3.3	0.41	0.66	J	J
BG02-SB03-05	4 - 5 ft	Magnesium (Mg)	840	mg/kg	33	2.3	3.3		
BG02-SB03-05	4 - 5 ft	Manganese (Mn)	97	mg/kg	0.66	0.12	0.17		
BG02-SB03-05	4 - 5 ft	Nickel	4.8	mg/kg	3.3	0.19	0.66		
BG02-SB03-05	4 - 5 ft	Silver	< 0.17	mg/kg	0.66	0.054	0.17		U
BG02-SB03-05	4 - 5 ft	Sodium (Na)	47	mg/kg	33	1.3	3.3		
BG02-SB03-05	4 - 5 ft	Antimony	2.9	mg/kg	0.66	0.25	0.33		
BG02-SB03-05	4 - 5 ft	Arsenic	1.8	mg/kg	1.3	0.48	0.66		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SB03-05	4 - 5 ft	Barium	11	mg/kg	6.6	0.20	3.3		
BG02-SB03-05	4 - 5 ft	Beryllium	0.11	mg/kg	0.17	0.0084	0.033	J	J
BG02-SB03-05	4 - 5 ft	Cadmium	0.025	mg/kg	0.17	0.022	0.033	J	J
BG02-SB03-05	4 - 5 ft	Chromium	10	mg/kg	0.33	0.054	0.26		
BG02-SB03-05	4 - 5 ft	Cobalt	3.1	mg/kg	0.66	0.059	0.17		
BG02-SB03-05	4 - 5 ft	Copper	29	mg/kg	3.3	0.27	0.66		
BG02-SB03-05	4 - 5 ft	Vanadium	17	mg/kg	1.7	0.084	0.66		
BG02-SB03-05	4 - 5 ft	Zinc	8.6	mg/kg	3.3	0.26	0.33		
BG02-SB03-05	4 - 5 ft	Calcium (Ca)	360	mg/kg	33	1.9	6.6		
BG02-SB03-05	4 - 5 ft	Selenium	< 0.99	mg/kg	1.3	0.77	0.99		U
BG02-SB03-05	4 - 5 ft	Potassium (K)	400	mg/kg	13	1.5	6.6		
BG02-SB03-05	4 - 5 ft	Thallium	0.048	mg/kg	0.14	0.033	0.034	J	J
BG02-SB03-05	4 - 5 ft	Anthracene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Pyrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Fluoranthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Acenaphthylene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Chrysene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Benzo(a)pyrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Benzo(a)anthracene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Acenaphthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Phenanthrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		UB
BG02-SB03-05	4 - 5 ft	Fluorene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	1-Methylnaphthalene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB03-05	4 - 5 ft	Naphthalene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		UB
BG02-SB03-05	4 - 5 ft	2-Methylnaphthalene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		UB
BG02-SB03-10	9 - 10 ft	Iron (Fe)	13000	mg/kg	110	23	36		
BG02-SB03-10	9 - 10 ft	Manganese (Mn)	230	mg/kg	7.3	1.3	1.8		
BG02-SB03-10	9 - 10 ft	Aluminum	12000	mg/kg	360	55	150		
BG02-SB03-10	9 - 10 ft	Lead	2.5	mg/kg	3.6	0.45	0.73	J	J
BG02-SB03-10	9 - 10 ft	Nickel	10	mg/kg	3.6	0.21	0.73		
BG02-SB03-10	9 - 10 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG02-SB03-10	9 - 10 ft	Sodium (Na)	89	mg/kg	36	1.5	3.6		
BG02-SB03-10	9 - 10 ft	Antimony	4.7	mg/kg	0.73	0.27	0.36		
BG02-SB03-10	9 - 10 ft	Arsenic	1.9	mg/kg	1.5	0.53	0.73		
BG02-SB03-10	9 - 10 ft	Barium	49	mg/kg	7.3	0.22	3.6		
BG02-SB03-10	9 - 10 ft	Beryllium	0.25	mg/kg	0.18	0.0092	0.036		
BG02-SB03-10	9 - 10 ft	Cadmium	0.026	mg/kg	0.18	0.024	0.036	J	J
BG02-SB03-10	9 - 10 ft	Chromium	17	mg/kg	0.36	0.060	0.29		
BG02-SB03-10	9 - 10 ft	Cobalt	5.1	mg/kg	0.73	0.066	0.18		
BG02-SB03-10	9 - 10 ft	Copper	36	mg/kg	3.6	0.30	0.73		
BG02-SB03-10	9 - 10 ft	Vanadium	21	mg/kg	1.8	0.092	0.73		
BG02-SB03-10	9 - 10 ft	Zinc	21	mg/kg	3.6	0.28	0.36		
BG02-SB03-10	9 - 10 ft	Calcium (Ca)	480	mg/kg	36	2.1	7.3		
BG02-SB03-10	9 - 10 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG02-SB03-10	9 - 10 ft	Magnesium (Mg)	3000	mg/kg	360	25	36		
BG02-SB03-10	9 - 10 ft	Potassium (K)	1800	mg/kg	150	17	73		
BG02-SB03-10	9 - 10 ft	Thallium	0.14	mg/kg	0.15	0.036	0.037	J	J
BG02-SB03-10	9 - 10 ft	Anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Benzo(g,h,i)perylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Indeno(1,2,3-cd)pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Benzo(b)fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Benzo(k)fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Acenaphthylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Chrysene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Benzo(a)pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Dibenz(a,h)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Benzo(a)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Acenaphthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Phenanthrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UB
BG02-SB03-10	9 - 10 ft	Fluorene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	1-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SB03-10	9 - 10 ft	Naphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UB
BG02-SB03-10	9 - 10 ft	2-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UB

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SB04-04	3 - 4 ft	Iron (Fe)	4500	mg/kg	100	22	35		
BG02-SB04-04	3 - 4 ft	Aluminum	3500	mg/kg	350	52	140		
BG02-SB04-04	3 - 4 ft	Lead	1.1	mg/kg	3.5	0.43	0.70	J	J
BG02-SB04-04	3 - 4 ft	Magnesium (Mg)	720	mg/kg	35	2.4	3.5		
BG02-SB04-04	3 - 4 ft	Manganese (Mn)	63	mg/kg	0.70	0.13	0.17		
BG02-SB04-04	3 - 4 ft	Nickel	3.1	mg/kg	3.5	0.20	0.70	J	J
BG02-SB04-04	3 - 4 ft	Silver	< 0.17	mg/kg	0.70	0.057	0.17		U
BG02-SB04-04	3 - 4 ft	Sodium (Na)	66	mg/kg	35	1.4	3.5		
BG02-SB04-04	3 - 4 ft	Antimony	1.4	mg/kg	0.70	0.26	0.35		
BG02-SB04-04	3 - 4 ft	Arsenic	1.1	mg/kg	1.4	0.50	0.70	J	J
BG02-SB04-04	3 - 4 ft	Barium	9.8	mg/kg	7.0	0.21	3.5		
BG02-SB04-04	3 - 4 ft	Beryllium	0.091	mg/kg	0.17	0.0088	0.035	J	J
BG02-SB04-04	3 - 4 ft	Cadmium	0.031	mg/kg	0.17	0.023	0.035	J	J
BG02-SB04-04	3 - 4 ft	Chromium	5.0	mg/kg	0.35	0.057	0.28		
BG02-SB04-04	3 - 4 ft	Cobalt	1.6	mg/kg	0.70	0.063	0.17		
BG02-SB04-04	3 - 4 ft	Copper	13	mg/kg	3.5	0.29	0.70		
BG02-SB04-04	3 - 4 ft	Vanadium	6.9	mg/kg	1.7	0.088	0.70		
BG02-SB04-04	3 - 4 ft	Zinc	5.6	mg/kg	3.5	0.27	0.35		
BG02-SB04-04	3 - 4 ft	Calcium (Ca)	550	mg/kg	35	2.0	7.0		
BG02-SB04-04	3 - 4 ft	Selenium	< 1.0	mg/kg	1.4	0.81	1.0		U
BG02-SB04-04	3 - 4 ft	Potassium (K)	340	mg/kg	14	1.6	7.0		
BG02-SB04-04	3 - 4 ft	Thallium	< 0.035	mg/kg	0.14	0.034	0.035		U
BG02-SB04-04	3 - 4 ft	Anthracene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Pyrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Benzo(g,h,i)perylene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Indeno(1,2,3-cd)pyrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Benzo(b)fluoranthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Fluoranthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Benzo(k)fluoranthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Acenaphthylene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Chrysene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Benzo(a)pyrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Dibenz(a,h)anthracene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Benzo(a)anthracene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Acenaphthene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Phenanthrene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		UB
BG02-SB04-04	3 - 4 ft	Fluorene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	1-Methylnaphthalene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		U
BG02-SB04-04	3 - 4 ft	Naphthalene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		UB
BG02-SB04-04	3 - 4 ft	2-Methylnaphthalene	< 0.00070	mg/kg	0.00070	0.00070	0.00070		UB
BG02-SB04-05	4 - 5 ft	Iron (Fe)	5600	mg/kg	110	23	38		
BG02-SB04-05	4 - 5 ft	Aluminum	3700	mg/kg	380	56	150		
BG02-SB04-05	4 - 5 ft	Lead	1.2	mg/kg	3.8	0.47	0.75	J	J
BG02-SB04-05	4 - 5 ft	Magnesium (Mg)	800	mg/kg	38	2.6	3.8		
BG02-SB04-05	4 - 5 ft	Manganese (Mn)	70	mg/kg	0.75	0.14	0.19		
BG02-SB04-05	4 - 5 ft	Nickel	3.2	mg/kg	3.8	0.21	0.75	J	J
BG02-SB04-05	4 - 5 ft	Silver	< 0.19	mg/kg	0.75	0.061	0.19		U
BG02-SB04-05	4 - 5 ft	Sodium (Na)	76	mg/kg	38	1.5	3.8		
BG02-SB04-05	4 - 5 ft	Antimony	1.5	mg/kg	0.75	0.28	0.38		
BG02-SB04-05	4 - 5 ft	Arsenic	1.5	mg/kg	1.5	0.54	0.75		J
BG02-SB04-05	4 - 5 ft	Barium	11	mg/kg	7.5	0.22	3.8		
BG02-SB04-05	4 - 5 ft	Beryllium	0.10	mg/kg	0.19	0.0095	0.038	J	J
BG02-SB04-05	4 - 5 ft	Cadmium	0.030	mg/kg	0.19	0.025	0.038	J	J
BG02-SB04-05	4 - 5 ft	Chromium	6.5	mg/kg	0.38	0.062	0.30		
BG02-SB04-05	4 - 5 ft	Cobalt	1.6	mg/kg	0.75	0.068	0.19		
BG02-SB04-05	4 - 5 ft	Copper	15	mg/kg	3.8	0.31	0.75		
BG02-SB04-05	4 - 5 ft	Vanadium	9.3	mg/kg	1.9	0.095	0.75		
BG02-SB04-05	4 - 5 ft	Zinc	5.9	mg/kg	3.8	0.29	0.38		
BG02-SB04-05	4 - 5 ft	Calcium (Ca)	630	mg/kg	38	2.2	7.5		
BG02-SB04-05	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.87	1.1		U
BG02-SB04-05	4 - 5 ft	Potassium (K)	350	mg/kg	15	1.7	7.5		
BG02-SB04-05	4 - 5 ft	Thallium	0.050	mg/kg	0.14	0.034	0.035	J	J
BG02-SB04-05	4 - 5 ft	Anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Benzo(b)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Benzo(k)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Acenaphthylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SB04-05	4 - 5 ft	Chrysene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Benzo(a)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Benzo(a)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Acenaphthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Phenanthrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UB
BG02-SB04-05	4 - 5 ft	Fluorene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	1-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SB04-05	4 - 5 ft	Naphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UB
BG02-SB04-05	4 - 5 ft	2-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		UB
BG02-SB04-05 DUP	4 - 5 ft	Iron (Fe)	6800	mg/kg	110	23	37		
BG02-SB04-05 DUP	4 - 5 ft	Aluminum	5000	mg/kg	370	55	150		
BG02-SB04-05 DUP	4 - 5 ft	Lead	1.9	mg/kg	3.7	0.46	0.74	J	J
BG02-SB04-05 DUP	4 - 5 ft	Magnesium (Mg)	940	mg/kg	37	2.6	3.7		
BG02-SB04-05 DUP	4 - 5 ft	Manganese (Mn)	82	mg/kg	0.74	0.14	0.18		
BG02-SB04-05 DUP	4 - 5 ft	Nickel	3.9	mg/kg	3.7	0.21	0.74		
BG02-SB04-05 DUP	4 - 5 ft	Silver	< 0.18	mg/kg	0.74	0.060	0.18		U
BG02-SB04-05 DUP	4 - 5 ft	Sodium (Na)	92	mg/kg	37	1.5	3.7		
BG02-SB04-05 DUP	4 - 5 ft	Antimony	1.6	mg/kg	0.74	0.28	0.37		
BG02-SB04-05 DUP	4 - 5 ft	Arsenic	2.0	mg/kg	1.5	0.53	0.74		
BG02-SB04-05 DUP	4 - 5 ft	Barium	14	mg/kg	7.4	0.22	3.7		
BG02-SB04-05 DUP	4 - 5 ft	Beryllium	0.15	mg/kg	0.18	0.0093	0.037	J	J
BG02-SB04-05 DUP	4 - 5 ft	Cadmium	< 0.037	mg/kg	0.18	0.024	0.037	UJ	U
BG02-SB04-05 DUP	4 - 5 ft	Chromium	7.3	mg/kg	0.37	0.061	0.29		
BG02-SB04-05 DUP	4 - 5 ft	Cobalt	1.8	mg/kg	0.74	0.066	0.18		
BG02-SB04-05 DUP	4 - 5 ft	Copper	19	mg/kg	3.7	0.31	0.74		
BG02-SB04-05 DUP	4 - 5 ft	Vanadium	9.8	mg/kg	1.8	0.093	0.74		
BG02-SB04-05 DUP	4 - 5 ft	Zinc	6.9	mg/kg	3.7	0.28	0.37		
BG02-SB04-05 DUP	4 - 5 ft	Calcium (Ca)	560	mg/kg	37	2.2	7.4		
BG02-SB04-05 DUP	4 - 5 ft	Selenium	< 1.1	mg/kg	1.5	0.86	1.1		U
BG02-SB04-05 DUP	4 - 5 ft	Potassium (K)	370	mg/kg	15	1.7	7.4		
BG02-SB04-05 DUP	4 - 5 ft	Thallium	0.043	mg/kg	0.15	0.036	0.037	J	J
BG02-SB04-05 DUP	4 - 5 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Benzo(g,h,i)perylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Benzo(b)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Chrysene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Benzo(a)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Benzo(a)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Phenanthrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UB
BG02-SB04-05 DUP	4 - 5 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SB04-05 DUP	4 - 5 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UB
BG02-SB04-05 DUP	4 - 5 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UB
BG02-SS01-01	0 - 1 ft	Iron (Fe)	8300	mg/kg	110	23	36		
BG02-SS01-01	0 - 1 ft	Aluminum	9200	mg/kg	360	54	140		
BG02-SS01-01	0 - 1 ft	Lead	3.0	mg/kg	3.6	0.45	0.72	J	J
BG02-SS01-01	0 - 1 ft	Magnesium (Mg)	780	mg/kg	36	2.5	3.6		
BG02-SS01-01	0 - 1 ft	Manganese (Mn)	76	mg/kg	0.72	0.13	0.18		
BG02-SS01-01	0 - 1 ft	Nickel	4.5	mg/kg	3.6	0.20	0.72		
BG02-SS01-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG02-SS01-01	0 - 1 ft	Sodium (Na)	53	mg/kg	36	1.5	3.6		
BG02-SS01-01	0 - 1 ft	Antimony	1.6	mg/kg	0.72	0.27	0.36		
BG02-SS01-01	0 - 1 ft	Arsenic	1.9	mg/kg	1.4	0.52	0.72		
BG02-SS01-01	0 - 1 ft	Barium	16	mg/kg	7.2	0.21	3.6		
BG02-SS01-01	0 - 1 ft	Beryllium	0.25	mg/kg	0.18	0.0091	0.036		
BG02-SS01-01	0 - 1 ft	Cadmium	0.033	mg/kg	0.18	0.024	0.036	J	J
BG02-SS01-01	0 - 1 ft	Chromium	9.3	mg/kg	0.36	0.059	0.29		
BG02-SS01-01	0 - 1 ft	Cobalt	1.8	mg/kg	0.72	0.065	0.18		
BG02-SS01-01	0 - 1 ft	Copper	20	mg/kg	3.6	0.30	0.72		
BG02-SS01-01	0 - 1 ft	Vanadium	14	mg/kg	1.8	0.091	0.72		
BG02-SS01-01	0 - 1 ft	Zinc	12	mg/kg	3.6	0.28	0.36		
BG02-SS01-01	0 - 1 ft	Calcium (Ca)	310	mg/kg	36	2.1	7.2		
BG02-SS01-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SS01-01	0 - 1 ft	Potassium (K)	240	mg/kg	14	1.7	7.2		
BG02-SS01-01	0 - 1 ft	Thallium	0.095	mg/kg	0.15	0.036	0.037	J	J
BG02-SS01-01	0 - 1 ft	Anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Pyrene	0.0017	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Benzo(b)fluoranthene	0.0014	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Fluoranthene	0.0018	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Acenaphthylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Chrysene	0.00087	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Benzo(a)pyrene	0.00076	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Benzo(a)anthracene	0.00090	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Acenaphthene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Phenanthrene	0.0012	mg/kg	0.00074	0.00074	0.00074		
BG02-SS01-01	0 - 1 ft	Fluorene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	1-Methylnaphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	Naphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS01-01	0 - 1 ft	2-Methylnaphthalene	0.00081	mg/kg	0.00074	0.00074	0.00074		
BG02-SS02-01	0 - 1 ft	Iron (Fe)	7300	mg/kg	110	22	36		
BG02-SS02-01	0 - 1 ft	Aluminum	8300	mg/kg	360	54	140		
BG02-SS02-01	0 - 1 ft	Lead	2.7	mg/kg	3.6	0.45	0.72	J	J
BG02-SS02-01	0 - 1 ft	Magnesium (Mg)	630	mg/kg	36	2.5	3.6		
BG02-SS02-01	0 - 1 ft	Manganese (Mn)	76	mg/kg	0.72	0.13	0.18		
BG02-SS02-01	0 - 1 ft	Nickel	3.8	mg/kg	3.6	0.20	0.72		
BG02-SS02-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG02-SS02-01	0 - 1 ft	Sodium (Na)	53	mg/kg	36	1.5	3.6		
BG02-SS02-01	0 - 1 ft	Antimony	1.3	mg/kg	0.72	0.27	0.36		
BG02-SS02-01	0 - 1 ft	Arsenic	1.1	mg/kg	1.4	0.52	0.72	J	J
BG02-SS02-01	0 - 1 ft	Barium	15	mg/kg	7.2	0.21	3.6		
BG02-SS02-01	0 - 1 ft	Beryllium	0.20	mg/kg	0.18	0.0091	0.036		
BG02-SS02-01	0 - 1 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG02-SS02-01	0 - 1 ft	Chromium	7.7	mg/kg	0.36	0.059	0.29		
BG02-SS02-01	0 - 1 ft	Cobalt	1.5	mg/kg	0.72	0.065	0.18		
BG02-SS02-01	0 - 1 ft	Copper	17	mg/kg	3.6	0.30	0.72		
BG02-SS02-01	0 - 1 ft	Vanadium	12	mg/kg	1.8	0.091	0.72		
BG02-SS02-01	0 - 1 ft	Zinc	10	mg/kg	3.6	0.28	0.36		
BG02-SS02-01	0 - 1 ft	Calcium (Ca)	320	mg/kg	36	2.1	7.2		
BG02-SS02-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG02-SS02-01	0 - 1 ft	Potassium (K)	220	mg/kg	14	1.7	7.2		
BG02-SS02-01	0 - 1 ft	Thallium	0.056	mg/kg	0.14	0.035	0.036	J	J
BG02-SS02-01	0 - 1 ft	Anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS02-01	0 - 1 ft	Pyrene	0.0074	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0024	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0021	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Benzo(b)fluoranthene	0.0057	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Fluoranthene	0.0080	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Benzo(k)fluoranthene	0.0022	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Acenaphthylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS02-01	0 - 1 ft	Chrysene	0.0036	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Benzo(a)pyrene	0.0035	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS02-01	0 - 1 ft	Benzo(a)anthracene	0.0041	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Acenaphthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS02-01	0 - 1 ft	Phenanthrene	0.0048	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	Fluorene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS02-01	0 - 1 ft	1-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS02-01	0 - 1 ft	Naphthalene	0.00074	mg/kg	0.00072	0.00072	0.00072		
BG02-SS02-01	0 - 1 ft	2-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS03-01	0 - 1 ft	Iron (Fe)	13000	mg/kg	110	23	37		
BG02-SS03-01	0 - 1 ft	Aluminum	12000	mg/kg	370	55	150		
BG02-SS03-01	0 - 1 ft	Lead	3.4	mg/kg	3.7	0.46	0.73	J	J
BG02-SS03-01	0 - 1 ft	Magnesium (Mg)	780	mg/kg	37	2.6	3.7		
BG02-SS03-01	0 - 1 ft	Manganese (Mn)	99	mg/kg	0.73	0.14	0.18		
BG02-SS03-01	0 - 1 ft	Nickel	4.5	mg/kg	3.7	0.21	0.73		
BG02-SS03-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG02-SS03-01	0 - 1 ft	Sodium (Na)	46	mg/kg	37	1.5	3.7		
BG02-SS03-01	0 - 1 ft	Antimony	1.3	mg/kg	0.73	0.28	0.37		
BG02-SS03-01	0 - 1 ft	Arsenic	0.99	mg/kg	1.5	0.53	0.73	J	J

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SS03-01	0 - 1 ft	Barium	19	mg/kg	7.3	0.22	3.7		
BG02-SS03-01	0 - 1 ft	Beryllium	0.20	mg/kg	0.18	0.0093	0.037		
BG02-SS03-01	0 - 1 ft	Cadmium	0.043	mg/kg	0.18	0.024	0.037	J	J
BG02-SS03-01	0 - 1 ft	Chromium	11	mg/kg	0.37	0.060	0.29		
BG02-SS03-01	0 - 1 ft	Cobalt	1.5	mg/kg	0.73	0.066	0.18		
BG02-SS03-01	0 - 1 ft	Copper	27	mg/kg	3.7	0.30	0.73		
BG02-SS03-01	0 - 1 ft	Vanadium	18	mg/kg	1.8	0.093	0.73		
BG02-SS03-01	0 - 1 ft	Zinc	13	mg/kg	3.7	0.28	0.37		
BG02-SS03-01	0 - 1 ft	Calcium (Ca)	310	mg/kg	37	2.2	7.3		
BG02-SS03-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG02-SS03-01	0 - 1 ft	Potassium (K)	300	mg/kg	15	1.7	7.3		
BG02-SS03-01	0 - 1 ft	Thallium	0.065	mg/kg	0.15	0.036	0.038	J	J
BG02-SS03-01	0 - 1 ft	Anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Pyrene	0.0029	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Benzo(g,h,i)perylene	0.00095	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Benzo(b)fluoranthene	0.0023	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Fluoranthene	0.0030	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Acenaphthylene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Chrysene	0.0014	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Benzo(a)pyrene	0.0013	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Benzo(a)anthracene	0.0014	mg/kg	0.00077	0.00077	0.00077		
BG02-SS03-01	0 - 1 ft	Acenaphthene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Phenanthrene	0.0021	mg/kg	0.00077	0.00077	0.00077		B
BG02-SS03-01	0 - 1 ft	Fluorene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	1-Methylnaphthalene	< 0.00077	mg/kg	0.00077	0.00077	0.00077		U
BG02-SS03-01	0 - 1 ft	Naphthalene	0.00097	mg/kg	0.00077	0.00077	0.00077		B
BG02-SS03-01	0 - 1 ft	2-Methylnaphthalene	0.0011	mg/kg	0.00077	0.00077	0.00077		B
BG02-SS04-01	0 - 1 ft	Iron (Fe)	9100	mg/kg	110	23	36		
BG02-SS04-01	0 - 1 ft	Aluminum	9800	mg/kg	360	54	140		
BG02-SS04-01	0 - 1 ft	Lead	2.6	mg/kg	3.6	0.45	0.72	J	J
BG02-SS04-01	0 - 1 ft	Magnesium (Mg)	880	mg/kg	36	2.5	3.6		
BG02-SS04-01	0 - 1 ft	Manganese (Mn)	70	mg/kg	0.72	0.13	0.18		
BG02-SS04-01	0 - 1 ft	Nickel	5.6	mg/kg	3.6	0.20	0.72		
BG02-SS04-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.72	0.059	0.18		U
BG02-SS04-01	0 - 1 ft	Sodium (Na)	52	mg/kg	36	1.5	3.6		
BG02-SS04-01	0 - 1 ft	Antimony	1.7	mg/kg	0.72	0.27	0.36		
BG02-SS04-01	0 - 1 ft	Arsenic	2.2	mg/kg	1.4	0.52	0.72		
BG02-SS04-01	0 - 1 ft	Barium	16	mg/kg	7.2	0.22	3.6		
BG02-SS04-01	0 - 1 ft	Beryllium	0.19	mg/kg	0.18	0.0092	0.036		
BG02-SS04-01	0 - 1 ft	Cadmium	< 0.036	mg/kg	0.18	0.024	0.036		U
BG02-SS04-01	0 - 1 ft	Chromium	9.4	mg/kg	0.36	0.060	0.29		
BG02-SS04-01	0 - 1 ft	Cobalt	1.9	mg/kg	0.72	0.065	0.18		
BG02-SS04-01	0 - 1 ft	Copper	20	mg/kg	3.6	0.30	0.72		
BG02-SS04-01	0 - 1 ft	Vanadium	14	mg/kg	1.8	0.092	0.72		
BG02-SS04-01	0 - 1 ft	Zinc	14	mg/kg	3.6	0.28	0.36		
BG02-SS04-01	0 - 1 ft	Calcium (Ca)	340	mg/kg	36	2.1	7.2		
BG02-SS04-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.4	0.84	1.1		U
BG02-SS04-01	0 - 1 ft	Potassium (K)	270	mg/kg	14	1.7	7.2		
BG02-SS04-01	0 - 1 ft	Thallium	0.063	mg/kg	0.14	0.034	0.035	J	J
BG02-SS04-01	0 - 1 ft	Anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Benzo(b)fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Acenaphthylene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Chrysene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Benzo(a)pyrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Benzo(a)anthracene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Acenaphthene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Phenanthrene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		UB
BG02-SS04-01	0 - 1 ft	Fluorene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	1-Methylnaphthalene	< 0.00072	mg/kg	0.00072	0.00072	0.00072		U
BG02-SS04-01	0 - 1 ft	Naphthalene	0.00085	mg/kg	0.00072	0.00072	0.00072		B
BG02-SS04-01	0 - 1 ft	2-Methylnaphthalene	0.00074	mg/kg	0.00072	0.00072	0.00072		B

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SS05-01	0 - 1 ft	Iron (Fe)	9900	mg/kg	110	23	37		
BG02-SS05-01	0 - 1 ft	Aluminum	9900	mg/kg	370	55	150		
BG02-SS05-01	0 - 1 ft	Lead	3.5	mg/kg	3.7	0.46	0.73	J	J
BG02-SS05-01	0 - 1 ft	Magnesium (Mg)	920	mg/kg	37	2.6	3.7		
BG02-SS05-01	0 - 1 ft	Manganese (Mn)	95	mg/kg	0.73	0.14	0.18		
BG02-SS05-01	0 - 1 ft	Nickel	5.1	mg/kg	3.7	0.21	0.73		
BG02-SS05-01	0 - 1 ft	Silver	< 0.18	mg/kg	0.73	0.060	0.18		U
BG02-SS05-01	0 - 1 ft	Sodium (Na)	55	mg/kg	37	1.5	3.7		
BG02-SS05-01	0 - 1 ft	Antimony	1.8	mg/kg	0.73	0.28	0.37		
BG02-SS05-01	0 - 1 ft	Arsenic	1.7	mg/kg	1.5	0.53	0.73		
BG02-SS05-01	0 - 1 ft	Barium	17	mg/kg	7.3	0.22	3.7		
BG02-SS05-01	0 - 1 ft	Beryllium	0.19	mg/kg	0.18	0.0093	0.037		
BG02-SS05-01	0 - 1 ft	Cadmium	0.039	mg/kg	0.18	0.024	0.037	J	J
BG02-SS05-01	0 - 1 ft	Chromium	10	mg/kg	0.37	0.060	0.29		
BG02-SS05-01	0 - 1 ft	Cobalt	2.0	mg/kg	0.73	0.066	0.18		
BG02-SS05-01	0 - 1 ft	Copper	23	mg/kg	3.7	0.30	0.73		
BG02-SS05-01	0 - 1 ft	Vanadium	16	mg/kg	1.8	0.093	0.73		
BG02-SS05-01	0 - 1 ft	Zinc	13	mg/kg	3.7	0.28	0.37		
BG02-SS05-01	0 - 1 ft	Calcium (Ca)	350	mg/kg	37	2.2	7.3		
BG02-SS05-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.85	1.1		U
BG02-SS05-01	0 - 1 ft	Potassium (K)	290	mg/kg	15	1.7	7.3		
BG02-SS05-01	0 - 1 ft	Thallium	0.059	mg/kg	0.15	0.035	0.037	J	J
BG02-SS05-01	0 - 1 ft	Anthracene	0.0018	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Pyrene	0.020	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0064	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0056	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Benzo(b)fluoranthene	0.016	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Fluoranthene	0.022	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Benzo(k)fluoranthene	0.0044	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Acenaphthylene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS05-01	0 - 1 ft	Chrysene	0.0092	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Benzo(a)pyrene	0.0092	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Dibenz(a,h)anthracene	0.00082	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Benzo(a)anthracene	0.011	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Acenaphthene	0.00075	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	Phenanthrene	0.013	mg/kg	0.00074	0.00074	0.00074		B
BG02-SS05-01	0 - 1 ft	Fluorene	0.00086	mg/kg	0.00074	0.00074	0.00074		
BG02-SS05-01	0 - 1 ft	1-Methylnaphthalene	< 0.00074	mg/kg	0.00074	0.00074	0.00074		U
BG02-SS05-01	0 - 1 ft	Naphthalene	0.00090	mg/kg	0.00074	0.00074	0.00074		B
BG02-SS05-01	0 - 1 ft	2-Methylnaphthalene	0.00083	mg/kg	0.00074	0.00074	0.00074		B
BG02-SS06-01	0 - 1 ft	Iron (Fe)	13000	mg/kg	110	23	37		
BG02-SS06-01	0 - 1 ft	Aluminum	14000	mg/kg	370	56	150		
BG02-SS06-01	0 - 1 ft	Lead	4.3	mg/kg	3.7	0.46	0.74		
BG02-SS06-01	0 - 1 ft	Magnesium (Mg)	1300	mg/kg	37	2.6	3.7		
BG02-SS06-01	0 - 1 ft	Manganese (Mn)	110	mg/kg	0.74	0.14	0.19		
BG02-SS06-01	0 - 1 ft	Nickel	7.5	mg/kg	3.7	0.21	0.74		
BG02-SS06-01	0 - 1 ft	Silver	< 0.19	mg/kg	0.74	0.061	0.19		U
BG02-SS06-01	0 - 1 ft	Sodium (Na)	64	mg/kg	37	1.5	3.7		
BG02-SS06-01	0 - 1 ft	Antimony	2.7	mg/kg	0.74	0.28	0.37		
BG02-SS06-01	0 - 1 ft	Arsenic	3.4	mg/kg	1.5	0.54	0.74		
BG02-SS06-01	0 - 1 ft	Barium	28	mg/kg	7.4	0.22	3.7		
BG02-SS06-01	0 - 1 ft	Beryllium	0.30	mg/kg	0.19	0.0094	0.037		
BG02-SS06-01	0 - 1 ft	Cadmium	0.031	mg/kg	0.19	0.025	0.037	J	J
BG02-SS06-01	0 - 1 ft	Chromium	15	mg/kg	0.37	0.061	0.30		
BG02-SS06-01	0 - 1 ft	Cobalt	2.9	mg/kg	0.74	0.067	0.19		
BG02-SS06-01	0 - 1 ft	Copper	31	mg/kg	3.7	0.31	0.74		
BG02-SS06-01	0 - 1 ft	Vanadium	21	mg/kg	1.9	0.094	0.74		
BG02-SS06-01	0 - 1 ft	Zinc	17	mg/kg	3.7	0.29	0.37		
BG02-SS06-01	0 - 1 ft	Calcium (Ca)	350	mg/kg	37	2.2	7.4		
BG02-SS06-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.87	1.1		U
BG02-SS06-01	0 - 1 ft	Potassium (K)	440	mg/kg	15	1.7	7.4		
BG02-SS06-01	0 - 1 ft	Thallium	0.088	mg/kg	0.15	0.036	0.037	J	J
BG02-SS06-01	0 - 1 ft	Anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	Pyrene	0.0035	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0014	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	Benzo(b)fluoranthene	0.0032	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Fluoranthene	0.0038	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	Acenaphthylene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SS06-01	0 - 1 ft	Chrysene	0.0015	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Benzo(a)pyrene	0.0016	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	Benzo(a)anthracene	0.0021	mg/kg	0.00076	0.00076	0.00076		
BG02-SS06-01	0 - 1 ft	Acenaphthene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	Phenanthrene	0.0023	mg/kg	0.00076	0.00076	0.00076		B
BG02-SS06-01	0 - 1 ft	Fluorene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	1-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		U
BG02-SS06-01	0 - 1 ft	Naphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UB
BG02-SS06-01	0 - 1 ft	2-Methylnaphthalene	< 0.00076	mg/kg	0.00076	0.00076	0.00076		UB
BG02-SS07-01	0 - 1 ft	Iron (Fe)	12000	mg/kg	110	23	38		
BG02-SS07-01	0 - 1 ft	Aluminum	9100	mg/kg	380	56	150		
BG02-SS07-01	0 - 1 ft	Lead	2.5	mg/kg	3.8	0.47	0.75	J	J
BG02-SS07-01	0 - 1 ft	Magnesium (Mg)	710	mg/kg	38	2.6	3.8		
BG02-SS07-01	0 - 1 ft	Manganese (Mn)	78	mg/kg	0.75	0.14	0.19		
BG02-SS07-01	0 - 1 ft	Nickel	4.2	mg/kg	3.8	0.21	0.75		
BG02-SS07-01	0 - 1 ft	Potassium (K)	240	mg/kg	15	1.7	7.5		
BG02-SS07-01	0 - 1 ft	Silver	< 0.19	mg/kg	0.75	0.061	0.19		U
BG02-SS07-01	0 - 1 ft	Sodium (Na)	38	mg/kg	38	1.5	3.8		
BG02-SS07-01	0 - 1 ft	Antimony	1.8	mg/kg	0.75	0.28	0.38		
BG02-SS07-01	0 - 1 ft	Arsenic	2.8	mg/kg	1.5	0.54	0.75		
BG02-SS07-01	0 - 1 ft	Barium	14	mg/kg	7.5	0.22	3.8		
BG02-SS07-01	0 - 1 ft	Beryllium	0.088	mg/kg	0.19	0.0095	0.038	J	J
BG02-SS07-01	0 - 1 ft	Cadmium	< 0.038	mg/kg	0.19	0.025	0.038		U
BG02-SS07-01	0 - 1 ft	Chromium	11	mg/kg	0.38	0.062	0.30		
BG02-SS07-01	0 - 1 ft	Cobalt	1.8	mg/kg	0.75	0.068	0.19		
BG02-SS07-01	0 - 1 ft	Copper	24	mg/kg	3.8	0.31	0.75		
BG02-SS07-01	0 - 1 ft	Vanadium	15	mg/kg	1.9	0.095	0.75		
BG02-SS07-01	0 - 1 ft	Zinc	11	mg/kg	3.8	0.29	0.38		
BG02-SS07-01	0 - 1 ft	Calcium (Ca)	270	mg/kg	38	2.2	7.5		
BG02-SS07-01	0 - 1 ft	Selenium	< 1.1	mg/kg	1.5	0.87	1.1		U
BG02-SS07-01	0 - 1 ft	Thallium	0.071	mg/kg	0.15	0.036	0.038	J	J
BG02-SS07-01	0 - 1 ft	Anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Pyrene	0.0017	mg/kg	0.00075	0.00075	0.00075		
BG02-SS07-01	0 - 1 ft	Benzo(g,h,i)perylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Benzo(b)fluoranthene	0.0016	mg/kg	0.00075	0.00075	0.00075		
BG02-SS07-01	0 - 1 ft	Fluoranthene	0.0017	mg/kg	0.00075	0.00075	0.00075		
BG02-SS07-01	0 - 1 ft	Benzo(k)fluoranthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Acenaphthylene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Chrysene	0.00079	mg/kg	0.00075	0.00075	0.00075		
BG02-SS07-01	0 - 1 ft	Benzo(a)pyrene	0.00080	mg/kg	0.00075	0.00075	0.00075		
BG02-SS07-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Benzo(a)anthracene	0.0011	mg/kg	0.00075	0.00075	0.00075		
BG02-SS07-01	0 - 1 ft	Acenaphthene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Phenanthrene	0.0013	mg/kg	0.00075	0.00075	0.00075		B
BG02-SS07-01	0 - 1 ft	Fluorene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	1-Methylnaphthalene	< 0.00075	mg/kg	0.00075	0.00075	0.00075		U
BG02-SS07-01	0 - 1 ft	Naphthalene	0.00093	mg/kg	0.00075	0.00075	0.00075		B
BG02-SS07-01	0 - 1 ft	2-Methylnaphthalene	0.00094	mg/kg	0.00075	0.00075	0.00075		B
BG02-SS08-01	0 - 1 ft	Iron (Fe)	6000	mg/kg	120	26	41		
BG02-SS08-01	0 - 1 ft	Aluminum	6700	mg/kg	410	62	170		
BG02-SS08-01	0 - 1 ft	Lead	2.9	mg/kg	4.1	0.52	0.83	J	J
BG02-SS08-01	0 - 1 ft	Magnesium (Mg)	390	mg/kg	41	2.9	4.1		
BG02-SS08-01	0 - 1 ft	Manganese (Mn)	36	mg/kg	0.83	0.15	0.21		
BG02-SS08-01	0 - 1 ft	Nickel	2.2	mg/kg	4.1	0.23	0.83	J	J
BG02-SS08-01	0 - 1 ft	Potassium (K)	230	mg/kg	17	1.9	8.3		
BG02-SS08-01	0 - 1 ft	Silver	< 0.21	mg/kg	0.83	0.068	0.21		U
BG02-SS08-01	0 - 1 ft	Sodium (Na)	69	mg/kg	41	1.7	4.1		
BG02-SS08-01	0 - 1 ft	Antimony	0.75	mg/kg	0.83	0.31	0.41	J	J
BG02-SS08-01	0 - 1 ft	Arsenic	0.99	mg/kg	1.7	0.60	0.83	J	J
BG02-SS08-01	0 - 1 ft	Barium	8.8	mg/kg	8.3	0.25	4.1		
BG02-SS08-01	0 - 1 ft	Beryllium	< 0.041	mg/kg	0.21	0.011	0.041		U
BG02-SS08-01	0 - 1 ft	Cadmium	< 0.041	mg/kg	0.21	0.027	0.041		U
BG02-SS08-01	0 - 1 ft	Chromium	6.0	mg/kg	0.41	0.068	0.33		
BG02-SS08-01	0 - 1 ft	Cobalt	0.68	mg/kg	0.83	0.075	0.21	J	J
BG02-SS08-01	0 - 1 ft	Copper	13	mg/kg	4.1	0.34	0.83		
BG02-SS08-01	0 - 1 ft	Vanadium	11	mg/kg	2.1	0.11	0.83		
BG02-SS08-01	0 - 1 ft	Zinc	5.0	mg/kg	4.1	0.32	0.41		
BG02-SS08-01	0 - 1 ft	Calcium (Ca)	230	mg/kg	41	2.4	8.3		

Table 1
Background Data Sample Results - Individual Results
Camp Hero Remedial Investigation
Montauk, New York

Sample ID	Depth Interval	Analyte	Result	Unit	Quantitation Limit	Method Detection Limit	Reporting Detection Limit	Validator Qualifiers	Lab Qualifiers
BG02-SS08-01	0 - 1 ft	Selenium	< 1.2	mg/kg	1.7	0.97	1.2		U
BG02-SS08-01	0 - 1 ft	Thallium	0.052	mg/kg	0.17	0.040	0.042	J	J
BG02-SS08-01	0 - 1 ft	Anthracene	< 0.00083	mg/kg	0.00083	0.00083	0.00083		U
BG02-SS08-01	0 - 1 ft	Pyrene	0.0052	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Benzo(g,h,i)perylene	0.0018	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Indeno(1,2,3-cd)pyrene	0.0015	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Benzo(b)fluoranthene	0.0047	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Fluoranthene	0.0053	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Benzo(k)fluoranthene	0.0014	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Acenaphthylene	< 0.00083	mg/kg	0.00083	0.00083	0.00083		U
BG02-SS08-01	0 - 1 ft	Chrysene	0.0023	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Benzo(a)pyrene	0.0025	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Dibenz(a,h)anthracene	< 0.00083	mg/kg	0.00083	0.00083	0.00083		U
BG02-SS08-01	0 - 1 ft	Benzo(a)anthracene	0.0032	mg/kg	0.00083	0.00083	0.00083		
BG02-SS08-01	0 - 1 ft	Acenaphthene	< 0.00083	mg/kg	0.00083	0.00083	0.00083		U
BG02-SS08-01	0 - 1 ft	Phenanthrene	0.0034	mg/kg	0.00083	0.00083	0.00083		B
BG02-SS08-01	0 - 1 ft	Fluorene	< 0.00083	mg/kg	0.00083	0.00083	0.00083		U
BG02-SS08-01	0 - 1 ft	1-Methylnaphthalene	< 0.00083	mg/kg	0.00083	0.00083	0.00083		U
BG02-SS08-01	0 - 1 ft	Naphthalene	0.0011	mg/kg	0.00083	0.00083	0.00083		B
BG02-SS08-01	0 - 1 ft	2-Methylnaphthalene	0.00096	mg/kg	0.00083	0.00083	0.00083		B

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Table 2
Background Data Sample Results - Total Results
Camp Hero Remedial Investigation
Montauk, New York

Sample Depth Category	Sample ID	Sample Depth (ft)	PF_Code	Analyte Group	Analyte	Unit	Total Results (KM Method)	Detect Indicator
sb	bg01-sb01	4	n	pah	hmw	mg/kg	0.00702	0
sb	bg01-sb01	4	n	pah	lmw	mg/kg	0.00702	0
sb	bg01-sb01	5	n	pah	hmw	mg/kg	0.00999	1
sb	bg01-sb01	5	n	pah	lmw	mg/kg	0.00959	1
sb	bg01-sb02	4	n	pah	hmw	mg/kg	0.00657	0
sb	bg01-sb02	4	n	pah	lmw	mg/kg	0.00657	0
sb	bg01-sb02	5	n	pah	hmw	mg/kg	0.01796	1
sb	bg01-sb02	5	n	pah	lmw	mg/kg	0.01413	1
sb	bg01-sb03	4	n	pah	hmw	mg/kg	0.0072	0
sb	bg01-sb03	4	n	pah	lmw	mg/kg	0.0072	0
sb	bg01-sb03	7	n	pah	hmw	mg/kg	0.00684	0
sb	bg01-sb03	7	n	pah	lmw	mg/kg	0.00684	0
sb	bg01-sb04	3	n	pah	hmw	mg/kg	0.00738	0
sb	bg01-sb04	3	n	pah	lmw	mg/kg	0.00738	0
sb	bg01-sb04	4	fd	pah	hmw	mg/kg	0.00693	0
sb	bg01-sb04	4	n	pah	hmw	mg/kg	0.00711	0
sb	bg01-sb04	4	fd	pah	lmw	mg/kg	0.00693	0
sb	bg01-sb04	4	n	pah	lmw	mg/kg	0.00711	0
sb	bg02-sb01	4	n	pah	hmw	mg/kg	0.00702	0
sb	bg02-sb01	4	n	pah	lmw	mg/kg	0.00702	0
sb	bg02-sb01	5	n	pah	hmw	mg/kg	0.03392	1
sb	bg02-sb01	5	n	pah	lmw	mg/kg	0.02042	1
sb	bg02-sb02	4	n	pah	hmw	mg/kg	0.00621	0
sb	bg02-sb02	4	n	pah	lmw	mg/kg	0.00621	0
sb	bg02-sb02	9	n	pah	hmw	mg/kg	0.00702	0
sb	bg02-sb02	9	n	pah	lmw	mg/kg	0.00702	0
sb	bg02-sb03	4	n	pah	hmw	mg/kg	0.0063	0
sb	bg02-sb03	4	n	pah	lmw	mg/kg	0.0063	0
sb	bg02-sb03	9	n	pah	hmw	mg/kg	0.00648	0
sb	bg02-sb03	9	n	pah	lmw	mg/kg	0.00648	0
sb	bg02-sb04	3	n	pah	hmw	mg/kg	0.0063	0
sb	bg02-sb04	3	n	pah	lmw	mg/kg	0.0063	0
sb	bg02-sb04	4	fd	pah	hmw	mg/kg	0.00684	0
sb	bg02-sb04	4	n	pah	hmw	mg/kg	0.00675	0
sb	bg02-sb04	4	fd	pah	lmw	mg/kg	0.00684	0
sb	bg02-sb04	4	n	pah	lmw	mg/kg	0.00675	0
sb	bg03-sb01	4	n	pah	hmw	mg/kg	0.00657	0
sb	bg03-sb01	4	n	pah	lmw	mg/kg	0.00657	0
sb	bg03-sb01	9	n	pah	hmw	mg/kg	0.00657	0
sb	bg03-sb01	9	n	pah	lmw	mg/kg	0.00657	0
sb	bg03-sb02	4	n	pah	hmw	mg/kg	0.00666	0
sb	bg03-sb02	4	n	pah	lmw	mg/kg	0.00827	1
sb	bg03-sb02	9	n	pah	hmw	mg/kg	0.00648	0
sb	bg03-sb02	9	n	pah	lmw	mg/kg	0.00648	0
sb	bg03-sb03	4	n	pah	hmw	mg/kg	0.00657	0
sb	bg03-sb03	4	n	pah	lmw	mg/kg	0.00817	1
sb	bg03-sb03	9	n	pah	hmw	mg/kg	0.00675	0
sb	bg03-sb03	9	n	pah	lmw	mg/kg	0.00675	0
sb	bg03-sb04	3	n	pah	hmw	mg/kg	0.00693	0
sb	bg03-sb04	3	n	pah	lmw	mg/kg	0.00693	0
sb	bg03-sb04	4	fd	pah	hmw	mg/kg	0.00666	0
sb	bg03-sb04	4	n	pah	hmw	mg/kg	0.00684	0
sb	bg03-sb04	4	fd	pah	lmw	mg/kg	0.00666	0
sb	bg03-sb04	4	n	pah	lmw	mg/kg	0.00684	0

Table 2
Background Data Sample Results - Total Results
Camp Hero Remedial Investigation
Montauk, New York

Sample Depth Category	Sample ID	Sample Depth (ft)	PF_Code	Analyte Group	Analyte	Unit	Total Results (KM Method)	Detect Indicator
sb	bg04-sb01	4	n	pah	hmw	mg/kg	0.00729	1
sb	bg04-sb01	4	n	pah	lmw	mg/kg	0.00757998	1
sb	bg04-sb01	9	n	pah	hmw	mg/kg	0.00711	0
sb	bg04-sb01	9	n	pah	lmw	mg/kg	0.00711	0
sb	bg04-sb02	4	n	pah	hmw	mg/kg	0.00711	0
sb	bg04-sb02	4	n	pah	lmw	mg/kg	0.00711	0
sb	bg04-sb02	9	n	pah	hmw	mg/kg	0.00711	0
sb	bg04-sb02	9	n	pah	lmw	mg/kg	0.00711	0
sb	bg04-sb03	4	n	pah	hmw	mg/kg	0.00702	0
sb	bg04-sb03	4	n	pah	lmw	mg/kg	0.00702	0
sb	bg04-sb03	9	n	pah	hmw	mg/kg	0.0072	0
sb	bg04-sb03	9	n	pah	lmw	mg/kg	0.0072	0
sb	bg04-sb04	4	fd	pah	hmw	mg/kg	0.00675	0
sb	bg04-sb04	4	n	pah	hmw	mg/kg	0.00693	0
sb	bg04-sb04	4	fd	pah	lmw	mg/kg	0.00675	0
sb	bg04-sb04	4	n	pah	lmw	mg/kg	0.00693	0
sb	bg04-sb04	9	n	pah	hmw	mg/kg	0.00639	0
sb	bg04-sb04	9	n	pah	lmw	mg/kg	0.00639	0
ss	bg01-sb01	0	n	pah	hmw	mg/kg	0.01076	1
ss	bg01-sb01	0	n	pah	lmw	mg/kg	0.0099	1
ss	bg01-sb02	0	n	pah	hmw	mg/kg	0.03942	1
ss	bg01-sb02	0	n	pah	lmw	mg/kg	0.02034	1
ss	bg01-sb03	0	n	pah	hmw	mg/kg	0.10224	1
ss	bg01-sb03	0	n	pah	lmw	mg/kg	0.0476	1
ss	bg01-sb04	0	n	pah	hmw	mg/kg	0.00909	1
ss	bg01-sb04	0	n	pah	lmw	mg/kg	0.00831996	1
ss	bg01-ss05	0	n	pah	hmw	mg/kg	2.563	1
ss	bg01-ss05	0	n	pah	lmw	mg/kg	1.017	1
ss	bg01-ss06	0	n	pah	hmw	mg/kg	0.04955	1
ss	bg01-ss06	0	n	pah	lmw	mg/kg	0.0276	1
ss	bg01-ss07	0	fd	pah	hmw	mg/kg	0.01087	1
ss	bg01-ss07	0	n	pah	hmw	mg/kg	0.00988	1
ss	bg01-ss07	0	fd	pah	lmw	mg/kg	0.00996	1
ss	bg01-ss07	0	n	pah	lmw	mg/kg	0.00851	1
ss	bg01-ss08	0	n	pah	hmw	mg/kg	0.00846	1
ss	bg01-ss08	0	n	pah	lmw	mg/kg	0.00846	1
ss	bg02-sb01	0	n	pah	hmw	mg/kg	0.00858996	1
ss	bg02-sb01	0	n	pah	lmw	mg/kg	0.00825	1
ss	bg02-sb02	0	n	pah	hmw	mg/kg	0.03168	1
ss	bg02-sb02	0	n	pah	lmw	mg/kg	0.01782	1
ss	bg02-sb03	0	n	pah	hmw	mg/kg	0.01256	1
ss	bg02-sb03	0	n	pah	lmw	mg/kg	0.01098	1
ss	bg02-sb04	0	n	pah	hmw	mg/kg	0.00648	0
ss	bg02-sb04	0	n	pah	lmw	mg/kg	0.00663	1
ss	bg02-ss05	0	n	pah	hmw	mg/kg	0.08262	1
ss	bg02-ss05	0	n	pah	lmw	mg/kg	0.04158	1
ss	bg02-ss06	0	n	pah	hmw	mg/kg	0.01557	1
ss	bg02-ss06	0	n	pah	lmw	mg/kg	0.01142	1
ss	bg02-ss07	0	n	pah	hmw	mg/kg	0.00899	1
ss	bg02-ss07	0	n	pah	lmw	mg/kg	0.00862	1
ss	bg02-ss08	0	n	pah	hmw	mg/kg	0.0234	1
ss	bg02-ss08	0	n	pah	lmw	mg/kg	0.01491	1
ss	bg03-sb01	0	n	pah	hmw	mg/kg	0.00819	1
ss	bg03-sb01	0	n	pah	lmw	mg/kg	0.00831996	1

Table 2
Background Data Sample Results - Total Results
Camp Hero Remedial Investigation
Montauk, New York

Sample Depth Category	Sample ID	Sample Depth (ft)	PF_Code	Analyte Group	Analyte	Unit	Total Results (KM Method)	Detect Indicator
ss	bg03-sb02	0	n	pah	hmw	mg/kg	0.00711	0
ss	bg03-sb02	0	n	pah	lmw	mg/kg	0.00885996	1
ss	bg03-sb03	0	n	pah	hmw	mg/kg	0.00702	0
ss	bg03-sb03	0	n	pah	lmw	mg/kg	0.01134	1
ss	bg03-sb04	0	n	pah	hmw	mg/kg	0.15299	1
ss	bg03-sb04	0	n	pah	lmw	mg/kg	0.08559	1
ss	bg03-ss05	0	n	pah	hmw	mg/kg	0.00774	0
ss	bg03-ss05	0	n	pah	lmw	mg/kg	0.00842	1
ss	bg03-ss06	0	n	pah	hmw	mg/kg	0.00885996	1
ss	bg03-ss06	0	n	pah	lmw	mg/kg	0.00918	1
ss	bg03-ss07	0	n	pah	hmw	mg/kg	0.02086	1
ss	bg03-ss07	0	n	pah	lmw	mg/kg	0.02084	1
ss	bg04-sb01	0	n	pah	hmw	mg/kg	0.4559	1
ss	bg04-sb01	0	n	pah	lmw	mg/kg	0.2952	1
ss	bg04-sb02	0	n	pah	hmw	mg/kg	1.548	1
ss	bg04-sb02	0	n	pah	lmw	mg/kg	1.026	1
ss	bg04-sb03	0	n	pah	hmw	mg/kg	0.2015	1
ss	bg04-sb03	0	n	pah	lmw	mg/kg	0.135	1
ss	bg04-sb04	0	n	pah	hmw	mg/kg	0.06408	1
ss	bg04-sb04	0	n	pah	lmw	mg/kg	0.0503	1
ss	bg04-ss05	0	n	pah	hmw	mg/kg	0.1643	1
ss	bg04-ss05	0	n	pah	lmw	mg/kg	0.1161	1
ss	bg04-ss06	0	n	pah	hmw	mg/kg	0.2043	1
ss	bg04-ss06	0	n	pah	lmw	mg/kg	0.1485	1
ss	bg04-ss07	0	n	pah	hmw	mg/kg	0.7512	1
ss	bg04-ss07	0	n	pah	lmw	mg/kg	0.5144	1
sb	bg01-sb01	4	n	pah	bapeq	mg/kg	0.00180258	0
sb	bg01-sb01	5	n	pah	bapeq	mg/kg	0.00124761	1
sb	bg01-sb02	4	n	pah	bapeq	mg/kg	0.00168703	0
sb	bg01-sb02	5	n	pah	bapeq	mg/kg	0.00250866	1
sb	bg01-sb03	4	n	pah	bapeq	mg/kg	0.0018488	0
sb	bg01-sb03	7	n	pah	bapeq	mg/kg	0.00175636	0
sb	bg01-sb04	3	n	pah	bapeq	mg/kg	0.00189502	0
sb	bg01-sb04	4	fd	pah	bapeq	mg/kg	0.00177947	0
sb	bg01-sb04	4	n	pah	bapeq	mg/kg	0.00182569	0
sb	bg02-sb01	4	n	pah	bapeq	mg/kg	0.00180258	0
sb	bg02-sb01	5	n	pah	bapeq	mg/kg	0.00516607	1
sb	bg02-sb02	4	n	pah	bapeq	mg/kg	0.00159459	0
sb	bg02-sb02	9	n	pah	bapeq	mg/kg	0.00180258	0
sb	bg02-sb03	4	n	pah	bapeq	mg/kg	0.0016177	0
sb	bg02-sb03	9	n	pah	bapeq	mg/kg	0.00166392	0
sb	bg02-sb04	3	n	pah	bapeq	mg/kg	0.0016177	0
sb	bg02-sb04	4	fd	pah	bapeq	mg/kg	0.00175636	0
sb	bg02-sb04	4	n	pah	bapeq	mg/kg	0.00173325	0
sb	bg03-sb01	4	n	pah	bapeq	mg/kg	0.00168703	0
sb	bg03-sb01	9	n	pah	bapeq	mg/kg	0.00168703	0
sb	bg03-sb02	4	n	pah	bapeq	mg/kg	0.00171014	0
sb	bg03-sb02	9	n	pah	bapeq	mg/kg	0.00166392	0
sb	bg03-sb03	4	n	pah	bapeq	mg/kg	0.00168703	0
sb	bg03-sb03	9	n	pah	bapeq	mg/kg	0.00173325	0
sb	bg03-sb04	3	n	pah	bapeq	mg/kg	0.00177947	0
sb	bg03-sb04	4	fd	pah	bapeq	mg/kg	0.00171014	0
sb	bg03-sb04	4	n	pah	bapeq	mg/kg	0.00175636	0
sb	bg04-sb01	4	n	pah	bapeq	mg/kg	0.00187191	0

Table 2
Background Data Sample Results - Total Results
Camp Hero Remedial Investigation
Montauk, New York

Sample Depth Category	Sample ID	Sample Depth (ft)	PF_Code	Analyte Group	Analyte	Unit	Total Results (KM Method)	Detect Indicator
sb	bg04-sb01	9	n	pah	bapeq	mg/kg	0.00182569	0
sb	bg04-sb02	4	n	pah	bapeq	mg/kg	0.00182569	0
sb	bg04-sb02	9	n	pah	bapeq	mg/kg	0.00182569	0
sb	bg04-sb03	4	n	pah	bapeq	mg/kg	0.00180258	0
sb	bg04-sb03	9	n	pah	bapeq	mg/kg	0.0018488	0
sb	bg04-sb04	4	fd	pah	bapeq	mg/kg	0.00173325	0
sb	bg04-sb04	4	n	pah	bapeq	mg/kg	0.00177947	0
sb	bg04-sb04	9	n	pah	bapeq	mg/kg	0.00164081	0
ss	bg01-sb01	0	n	pah	bapeq	mg/kg	0.00135142	1
ss	bg01-sb02	0	n	pah	bapeq	mg/kg	0.00619864	1
ss	bg01-sb03	0	n	pah	bapeq	mg/kg	0.01575	1
ss	bg01-sb04	0	n	pah	bapeq	mg/kg	0.000387212	1
ss	bg01-ss05	0	n	pah	bapeq	mg/kg	0.6416	1
ss	bg01-ss06	0	n	pah	bapeq	mg/kg	0.0077	1
ss	bg01-ss07	0	fd	pah	bapeq	mg/kg	0.00136157	1
ss	bg01-ss07	0	n	pah	bapeq	mg/kg	0.00123102	1
ss	bg01-ss08	0	n	pah	bapeq	mg/kg	0.000308476	1
ss	bg02-sb01	0	n	pah	bapeq	mg/kg	0.00103915	1
ss	bg02-sb02	0	n	pah	bapeq	mg/kg	0.00495873	1
ss	bg02-sb03	0	n	pah	bapeq	mg/kg	0.00174902	1
ss	bg02-sb04	0	n	pah	bapeq	mg/kg	0.00166392	0
ss	bg02-ss05	0	n	pah	bapeq	mg/kg	0.0133	1
ss	bg02-ss06	0	n	pah	bapeq	mg/kg	0.0022414	1
ss	bg02-ss07	0	n	pah	bapeq	mg/kg	0.00112686	1
ss	bg02-ss08	0	n	pah	bapeq	mg/kg	0.00364756	1
ss	bg03-sb01	0	n	pah	bapeq	mg/kg	0.000186256	1
ss	bg03-sb02	0	n	pah	bapeq	mg/kg	0.00182569	0
ss	bg03-sb03	0	n	pah	bapeq	mg/kg	0.00180258	0
ss	bg03-sb04	0	n	pah	bapeq	mg/kg	0.0259	1
ss	bg03-ss05	0	n	pah	bapeq	mg/kg	0.00198746	0
ss	bg03-ss06	0	n	pah	bapeq	mg/kg	0.000214928	1
ss	bg03-ss07	0	n	pah	bapeq	mg/kg	0.0032697	1
ss	bg04-sb01	0	n	pah	bapeq	mg/kg	0.0686	1
ss	bg04-sb02	0	n	pah	bapeq	mg/kg	0.2317	1
ss	bg04-sb03	0	n	pah	bapeq	mg/kg	0.02961	1
ss	bg04-sb04	0	n	pah	bapeq	mg/kg	0.00966	1
ss	bg04-ss05	0	n	pah	bapeq	mg/kg	0.02632	1
ss	bg04-ss06	0	n	pah	bapeq	mg/kg	0.03115	1
ss	bg04-ss07	0	n	pah	bapeq	mg/kg	0.119	1

Attachment D

Background Soil Calculation Tables

Table ES-1
Selected Soil BTVs for Metals and PAHs
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Soil Type[1]	Upper Tolerance Limit (UTL) Surface Soil[2]	Upper Tolerance Limit (UTL) Subsurface Soil[2]	Upper Tolerance Limit (UTL) Depths Combined[2]
Metals (mg/kg)				
Aluminum	--	23,519	27,329	27,822
Antimony	--	5.6	10.3	--
Arsenic	ML	5.533	4.334	5.064
	WSL	3.729		3.383
Barium	--	56.3	121.5	--
Beryllium	--	4.9	0.451	0.815
Cadmium	--	< 0.18 to < 0.22	< 0.17 to < 0.20	--
Calcium (Ca)	ML	1,014	2,677	2,500
	WSL		926.8	751.8
Chromium	--	29.14	43.69	33.92
Cobalt	--	4.85	10.24	--
Copper	--	45.15	70.15	57.2
Iron (Fe)	ML	24,828	38,926	37,927
	WSL	33,536		19,000
Lead	--	10.14	5.876	--
Magnesium (Mg)	--	3,186	8,315	--
Manganese (Mn)	ML	198.8	656.8	--
	WSL	155.6		
Nickel	--	13.17	21.28	18.21
Potassium (K)	--	940	5660	--
Selenium	--	< 0.84 to < 1.0	< 0.77 to <0.95	< 0.77 to < 1.0
Silver	--	< 0.72 to < 0.88	<0.054 to < 0.066	< 0.66 to < 0.88
Sodium (Na)	--	122.5	320	--
Thallium	--	< 0.14 to < 0.18	0.414	--
Vanadium	--	33.43	60.91	46.28
Zinc	--	32.06	54.2	42.36
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg) [3]				
1-Methylnaphthalene	--	0.00578	< 0.00069 to <0.00082	--
2-Methylnaphthalene	--	0.016	< 0.00069 to <0.00082	--
Acenaphthene	--	0.0305	< 0.00069 to <0.00082	--
Acenaphthylene	--	< 0.00072 to < 0.016	< 0.00069 to <0.00082	--
Anthracene	--	0.0481	< 0.00069 to <0.00082	--

Table ES-1
Selected Soil BTVs for Metals and PAHs
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Soil Type[1]	Upper Tolerance Limit (UTL) Surface Soil[2]	Upper Tolerance Limit (UTL) Subsurface Soil[2]	Upper Tolerance Limit (UTL) Depths Combined[2]
Benzo(a)anthracene	--	0.138	< 0.00069 to <0.00082	--
Benzo(a)pyrene	--	0.247	< 0.00069 to <0.00082	--
Benzo(b)fluoranthene	--	0.334	< 0.00069 to <0.00082	--
Benzo(g,h,i)perylene	--	0.0664	< 0.00069 to <0.00082	--
Benzo(k)fluoranthene	--	0.12	< 0.00069 to <0.00082	--
Chrysene	--	0.13	< 0.00069 to <0.00082	--
Dibenz(a,h)anthracene	--	< 0.00072 to < 0.016	< 0.00069 to <0.00082	--
Fluoranthene	--	0.733	< 0.00069 to <0.00082	--
Fluorene	--	0.0304	< 0.00069 to <0.00082	--
Indeno(1,2,3-cd)pyrene	--	0.298	< 0.00069 to <0.00082	--
Naphthalene	--	0.016	< 0.00069 to <0.00082	--
Phenanthrene	--	0.362	< 0.00069 to <0.00082	--
Pyrene	--	0.278	< 0.00069 to <0.00082	--
Total PAHs (mg/kg)				
LMW PAHs	--	1.026	0.0134	--
HMW PAHs	--	1.791	0.0189	--
Total BaP TEQ (mg/kg)				
BaP TEQ	--	0.493	0.00296	--

Notes:

All units in milligrams per kilogram (mg/kg)

BTV = Background Threshold Value

N/A = Not Applicable

ML = Montauk Loam

WSL = Whitman Sandy Loam

UTL = Upper Tolerance Limit

[1] ML and WSL soil types combined based on results of permutation tests, unless otherwise noted

[2] EPA's ProUCL software (Version 5.1) was used to calculate BTVs for each analyte

[3] Subsurface soil BTVs and combined soil BTVs were not calculated for PAHs due to the high number of NDs in the subsurface soil data set.

Table 1
Summary Statistics for Surface Soil
Camp Hero Remedial Investigation
Montauk, New York

	Number of Samples		Percent Detects (%)		Mean		Std. Deviation		Maximum Detected		Location of Maximum		Minimum Detected		Maximum ND MDL		Minimum ND MDL	
Analyte	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam	Montauk Loam	Whitman Sandy Loam
METALS (MG/KG)																		
Aluminum	15	15	100.00	100.00	13133	11743	4243	5707	21000	22000	BG04-SS04 (0 - 1 ft)	BG03-SS05 (0 - 1 ft)	6700	5200	--	--	--	--
Antimony	15	15	100.00	100.00	1.863	2.358	0.65	1.676	3.2	5.3	BG04-SS02 (0 - 1 ft)	BG03-SB03 (0 - 1 ft) BG01-SS06 (0 - 1 ft)	0.75	0.45	--	--	--	--
Arsenic	15	15	100.00	93.33	2.612	1.759	1.138	0.768	4.6	3	BG04-SS05 (0 - 1 ft)	BG03-SB04 (0 - 1 ft)	0.99	0.88	--	0.56	--	0.56
Barium	15	15	100.00	100.00	24.72	20.24	9.861	9.381	38	38	BG04-SS07 (0 - 1 ft)	BG03-SB04 (0 - 1 ft)	8.8	9.25	--	--	--	--
Beryllium	15	15	93.33	93.33	0.178	0.4	0.0702	1.204	0.3	4.9	BG02-SB06 (0 - 1 ft)	BG01-SS06 (0 - 1 ft)	0.086	0.034	0.011	0.0098	0.011	0.0098
Cadmium	15	15	60.00	66.67	0.0367	0.331	0.0176	1.009	0.091 J	4.1	BG04-SS07 (0 - 1 ft)	BG01-SS06 (0 - 1 ft)	0.031	0.033	0.024	0.024	0.027	0.026
Calcium (Ca)	15	15	100.00	100.00	513.3	338.3	375.9	110.8	1700	540	BG04-SS02 (0 - 1 ft)	BG03-SS07 (0 - 1 ft)	230	220	--	--	--	--
Chromium	15	15	100.00	100.00	12.96	12.73	5.611	6.732	30	24	BG04-SS02 (0 - 1 ft)	BG03-SB03 (0 - 1 ft)	6	4.2	--	--	--	--
Cobalt	15	15	100.00	100.00	2.025	2.316	0.683	1.583	3.4	5.5	BG04-SS02 (0 - 1 ft)	BG01-SS06 (0 - 1 ft)	0.68	0.57	--	--	--	--
Copper	15	15	100.00	100.00	27.47	21.57	7.52	10.18	38	41	BG04-SS05 (0 - 1 ft)	BG03-SB03 (0 - 1 ft)	13	9	--	--	--	--
Iron (Fe)	15	15	100.00	100.00	13240	9473	4516	5009	20000	18000	BG04-SS04 (0 - 1 ft) BG04-SS05 (0 - 1 ft)	BG03-SB03 (0 - 1 ft)	6000	3600	--	--	--	--
Lead	15	15	100.00	100.00	4.813	5.283	2.249	2.395	10	11	BG04-SS07 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	2.5	3.1	--	--	--	--
Magnesium (Mg)	15	15	100.00	100.00	1266	1032	644.7	745.8	2900	2500	BG04-SS02 (0 - 1 ft)	BG03-SB03 (0 - 1 ft) BG03-SB04 (0 - 1 ft)	390	290	--	--	--	--
Manganese (Mn)	15	15	100.00	100.00	106	70.6	36.17	33.11	180	120	BG04-SS02 (0 - 1 ft)	BG03-SB02 (0 - 1 ft) BG03-SB03 (0 - 1 ft) BG03-SB04 (0 - 1 ft)	36	30	--	--	--	--
Nickel	15	15	100.00	100.00	6.3	6.507	2.43	3.648	12	14	BG04-SS02 (0 - 1 ft)	BG03-SB03 (0 - 1 ft)	2.2	1.9	--	--	--	--
Potassium (K)	15	15	100.00	100.00	462	411.3	225.9	216.2	940	810	BG04-SS02 (0 - 1 ft)	BG03-SB04 (0 - 1 ft)	220	170	--	--	--	--
Selenium	15	15	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.84	0.84	0.98	1
Silver	15	15	0.00	13.33	--	0.309	--	0.933	--	3.8	--	BG01-SS06 (0 - 1 ft)	--	0.066	0.059	0.059	0.069	0.072
Sodium (Na)	15	15	100.00	100.00	73.13	57.07	38.37	10.63	200	80	BG04-SS02 (0 - 1 ft)	BG03-SB04 (0 - 1 ft)	38	42	--	--	--	--
Thallium	15	15	100.00	100.00	0.0925	0.0868	0.0306	0.0266	0.15 J	0.14 J	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.052	0.055	--	--	--	--
Vanadium	15	15	100.00	100.00	19.53	17.04	5.436	7.971	26	30	BG04-SS04 (0 - 1 ft) BG04-SS05 (0 - 1 ft)	BG03-SB03 (0 - 1 ft)	11	7.1	--	--	--	--
Zinc	15	15	100.00	100.00	16.8	15.82	6.085	8.171	25	39	BG04-SS02 (0 - 1 ft)	BG03-SB04 (0 - 1 ft)	5	6.65	--	--	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)																		
1-Methylnaphthalene	15	15	13.33	33.33	0.00171	0.00128	0.00242	0.00129	0.0086	0.0059	BG04-SS07 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0063	0.00082	0.00072	0.00074	0.016	0.00088
2-Methylnaphthalene	15	15	46.67	53.33	0.00135	0.00164	0.00165	0.00133	0.0068	0.0052	BG04-SS06 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00074	0.00087	0.00072	0.00074	0.016	0.00078
Acenaphthene	15	15	40.00	20.00	0.00373	0.00236	0.00647	0.00579	0.025	0.024	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00075	0.00082	0.00072	0.000745	0.0079	0.00088
Acenaphthylene	15	15	0.00	20.00	--	0.00158	--	0.0028	--	0.012	--	BG01-SB05 (0 - 1 ft)	--	0.001	0.00072	0.000745	0.016	0.00088
Anthracene	15	15	53.33	33.33	0.0088	0.00471	0.0164	0.014	0.065	0.057	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0018	0.00076	0.00072	0.000745	0.00083	0.00088
Benzo(a)anthracene	15	15	93.33	66.67	0.0325	0.0172	0.0566	0.0492	0.22	0.2 J-	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0009	0.00088	0.00072	0.00076	0.00072	0.00088
Benzo(a)pyrene	15	15	93.33	53.33	0.0266	0.0386	0.0447	0.131	0.17	0.53	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00076	0.000885	0.00072	0.00076	0.00072	0.00088
Benzo(b)fluoranthene	15	15	93.33	80.00	0.0402	0.0265	0.0666	0.0738	0.25	0.3 J-	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0014	0.0013	0.00072	0.00078	0.00072	0.00086
Benzo(g,h,i)perylene	15	15	73.33	60.00	0.0127	0.0075	0.0246	0.0201	0.1	0.082 J+	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00095	0.00079	0.00072	0.00076	0.0086	0.00088
Benzo(k)fluoranthene	15	15	66.67	40.00	0.0146	0.031	0.0233	0.109	0.086	0.44	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0014	0.00095	0.00072	0.000745	0.00077	0.00088
Chrysene	15	15	93.33	60.00	0.0303	0.0165	0.0522	0.0493	0.2	0.2 J-	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00079	0.00086	0.00072	0.00076	0.00072	0.00088
Dibenz(a,h)anthracene	15	15	6.67	6.67	--	--	--	--	0.00082	0.021	BG02-SB05 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00082	0.021	0.00072	0.00074	0.016	0.00088
Fluoranthene	15	15	93.33	80.00	0.0819	0.0449	0.142	0.141	0.54	0.57 J-	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0017	0.0012	0.00072	0.00078	0.00072	0.00086
Fluorene	15	15	40.00	20.00	0.00357	0.00281	0.00615	0.00728	0.024	0.03	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00086	0.0011	0.00072	0.000745	0.0079	0.00088
Indeno(1,2,3-cd)pyrene	15	15	60.00	40.00	0.015	0.0259	0.0263	0.0893	0.1	0.36	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0015	0.0012	0.00072	0.000745	0.0025	0.00088
Naphthalene	15	15	46.67	60.00	0.0012	0.00169	0.00109	0.00141	0.0048	0.0057	BG04-SS06 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.00074	0.0008	0.00074	0.00075	0.016	0.00078
Phenanthrene	15	15	93.33	86.67	0.0477	0.0258	0.0816	0.0764	0.31	0.31 J-	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0012	0.00096	0.00072	0.00079	0.00072	0.00086
Pyrene	15	15	93.33	80.00	0.0633	0.0349	0.108	0.106	0.41	0.43 J-	BG04-SS02 (0 - 1 ft)	BG01-SB05 (0 - 1 ft)	0.0017	0.0012	0.00072	0.00078	0.00072	0.00086

Notes:
All units are in milligrams per kilogram (mg/kg)
If the dataset contains nondetects, summary statistics are censored at the MDL and are estimated by the Kaplan-Meier (KM) method.
If duplicates exist, 1. if the duplicate pair was both detect or both non-detect, the average of the duplicate results was used as a single data point; 2. if the duplicate pair contained a detect and non-detect, the maximum detect was used.
-- = no value; ft = feet; MDL = method detection limit; ND = non-detect; PAH = polycyclic aromatic hydrocarbon; Std = standard.

Data Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is an estimated quantity with an unknown bias.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The result has been evaluated to be undetected at the reporting limit or at the reported concentration; result is considered to be a false positive.

Table 2
Summary Statistics for Subsurface Soil
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Number of Samples Montauk Loam	Number of Samples Whitman Sandy Loam	Percent Detects (%) Montauk Loam	Percent Detects (%) Whitman Sandy Loam	Mean Montauk Loam	Mean Whitman Sandy Loam	Std. Deviation Montauk Loam	Std. Deviation Whitman Sandy Loam	Maximum Detected Montauk Loam	Maximum Detected Whitman Sandy Loam	Location of Maximum Montauk Loam	Location of Maximum Whitman Sandy Loam	Minimum Detected Montauk Loam	Minimum Detected Whitman Sandy Loam	Maximum ND MDL Montauk Loam	Maximum ND MDL Whitman Sandy Loam	Minimum ND MDL Montauk Loam	Minimum ND MDL Whitman Sandy Loam
METALS (MG/KG)																		
Aluminum	16	16	100.00	100.00	12147	9488	9860	4110	31000	16000 J+	BG04-SB03 (4 - 5 ft)	BG03-SB02 (4 - 5 ft) BG03-SB03 (4 - 5 ft)	2700	2700	--	--	--	--
Antimony	16	16	100.00	100.00	4.084	3.029	3.188	1.63	9.8	5.6	BG04-SB01 (9 - 10 ft)	BG03-SB04 (3 - 4 ft)	1.4	0.72	--	--	--	--
Arsenic	16	16	93.75	93.75	2.344	1.828	1.235	0.676	5	3	BG04-SB02 (9 - 10 ft)	BG03-SB01 (9 - 10 ft)	0.74	0.75	0.56	0.57	0.56	0.57
Barium	16	16	100.00	100.00	41.67	29.99	43.16	16	140	58	BG04-SB01 (9 - 10 ft)	BG03-SB03 (9 - 10 ft)	7.9	5.3	--	--	--	--
Beryllium	16	16	93.75	87.50	0.156	0.0899	0.146	0.0748	0.63	0.26 J-	BG04-SB02 (9 - 10 ft)	BG03-SB02 (4 - 5 ft)	0.039	0.023	0.01	0.0092	0.01	0.0094
Cadmium	16	16	68.75	25.00	0.0368	0.0351	0.017	0.02	0.07 J	0.08 J	BG04-SB02 (9 - 10 ft)	BG03-SB04 (3 - 4 ft)	0.025	0.051	0.022	0.024	0.027	0.026
Calcium (Ca)	16	16	100.00	100.00	755	440	562.6	192.9	2500	960	BG04-SB01 (9 - 10 ft)	BG03-SB03 (9 - 10 ft)	250	170	--	--	--	--
Chromium	16	16	100.00	100.00	17.44	13.63	13.58	5.168	41	21	BG04-SB01 (9 - 10 ft)	BG03-SB03 (4 - 5 ft)	3.6	3.2	--	--	--	--
Cobalt	16	16	100.00	100.00	4.213	2.934	3.157	1.559	9.8	5.3	BG04-SB01 (9 - 10 ft)	BG03-SB03 (9 - 10 ft) BG03-SB04 (3 - 4 ft)	1.4	0.7	--	--	--	--
Copper	16	16	100.00	100.00	34.81	25.72	22.35	12.01	76	42	BG04-SB01 (9 - 10 ft)	BG03-SB03 (4 - 5 ft)	11	5.4	--	--	--	--
Iron (Fe)	16	16	100.00	100.00	15563	10344	11468	5572	38000	19000	BG04-SB03 (4 - 5 ft)	BG03-SB03 (4 - 5 ft)	4400	1900	--	--	--	--
Lead	16	16	100.00	100.00	2.976	2.566	1.861	0.785	5.8	3.7 J	BG04-SB02 (4 - 5 ft)	BG01-SB03 (4 - 5 ft)	0.87	0.61	--	--	--	--
Magnesium (Mg)	16	16	100.00	100.00	2909	1923	2898	1126	8800	3900	BG04-SB01 (9 - 10 ft)	BG03-SB03 (4 - 5 ft)	560	320	--	--	--	--
Manganese (Mn)	16	16	100.00	100.00	239.2	158.5	206.7	105.8	760	370	BG04-SB02 (9 - 10 ft)	BG03-SB03 (4 - 5 ft)	63	25	--	--	--	--
Nickel	16	16	100.00	100.00	9.319	7.031	7.771	3.331	25	12	BG04-SB01 (9 - 10 ft)	BG03-SB02 (4 - 5 ft) BG03-SB03 (4 - 5 ft)	2.2	1.6	--	--	--	--
Potassium (K)	16	16	100.00	100.00	1753	1261	2049	835.9	6100	3100	BG04-SB01 (9 - 10 ft)	BG03-SB03 (4 - 5 ft)	320	210	--	--	--	--
Selenium	16	16	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.77	0.82	0.95	0.93
Silver	16	16	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.54	0.058	0.066	0.066
Sodium (Na)	16	16	100.00	100.00	112	75.41	74.51	26.35	320	150	BG04-SB01 (9 - 10 ft)	BG03-SB03 (9 - 10 ft)	47	41	--	--	--	--
Thallium	16	16	93.75	93.75	0.151	0.119	0.144	0.0514	0.45	0.22	BG04-SB01 (9 - 10 ft)	BG03-SB02 (4 - 5 ft)	0.042	0.06	0.034	0.038	0.034	0.038
Vanadium	16	16	100.00	100.00	24.95	17.98	19.99	6.493	60	28	BG04-SB03 (4 - 5 ft)	BG01-SB03 (4 - 5 ft)	6.2	4.1	--	--	--	--
Zinc	16	16	93.75	100.00	19.06	14.53	15.49	6.209	50	23 J-	BG04-SB01 (9 - 10 ft)	BG03-SB02 (4 - 5 ft) BG03-SB03 (4 - 5 ft)	5.2	3	0.27	--	0.35	--
POLYCYCLIC AROMATIC HYDROCARBONS (MG/KG)																		
1-Methylnaphthalene	16	16	0.00	12.50	--	0.00074188	--	0.000062271	--	0.00096	--	BG03-SB03 (4 - 5 ft)	--	0.00083	0.00069	0.00072	0.00081	0.00082
2-Methylnaphthalene	16	16	0.00	12.50	--	0.00087375	--	0.00041023	--	0.0021	--	BG03-SB03 (4 - 5 ft)	--	0.0018	0.00069	0.00072	0.00081	0.00082
Acenaphthene	16	16	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00069	0.00072	0.00081	0.00082
Acenaphthylene	16	16	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00069	0.00072	0.00081	0.00082
Anthracene	16	16	0.00	6.25	--	--	--	--	--	0.00081	--	BG01-SB02 (5 - 6 ft)	--	0.00081	0.00069	0.00072	0.00081	0.00082
Benzo(a)anthracene	16	16	6.25	12.50	--	0.00086125	--	0.00045823	0.0046	0.0026	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0046	0.0011	0.00069	0.00072	0.00081	0.00082
Benzo(a)pyrene	16	16	6.25	12.50	--	0.00079375	--	0.00023893	0.0038	0.0017	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0038	0.00092	0.00069	0.00072	0.00081	0.00082
Benzo(b)fluoranthene	16	16	6.25	12.50	--	0.00091125	--	0.00055574	0.0064	0.0029	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0064	0.0016	0.00069	0.00072	0.00081	0.00082
Benzo(g,h,i)perylene	16	16	6.25	6.25	--	--	--	--	0.0031	0.0013 J+	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0031	0.0013	0.00069	0.00072	0.00081	0.00082
Benzo(k)fluoranthene	16	16	6.25	6.25	--	--	--	--	0.0022	0.0012	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0022	0.0012	0.00069	0.00072	0.00081	0.00082
Chrysene	16	16	6.25	12.50	--	0.00081125	--	0.00028913	0.0036	0.0019	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0036	0.001	0.00069	0.00072	0.00081	0.00082
Dibenz(a,h)anthracene	16	16	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00069	0.00072	0.00081	0.00082
Fluoranthene	16	16	12.50	12.50	0.00125	0.0011	0.00208	0.0011	0.0093	0.005	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0011	0.0025	0.00069	0.00072	0.0008	0.00082
Fluorene	16	16	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00069	0.00072	0.00081	0.00082
Indeno(1,2,3-cd)pyrene	16	16	0.00	6.25	--	--	--	--	--	0.0011	--	BG01-SB02 (5 - 6 ft)	--	0.0011	0.00069	0.00072	0.00081	0.00082
Naphthalene	16	16	0.00	6.25	--	--	--	--	--	0.0012	--	BG03-SB02 (4 - 5 ft)	--	0.0012	0.00069	0.00072	0.00081	0.00082
Phenanthrene	16	16	6.25	12.50	--	0.00097375	--	0.00076716	0.0058	0.0038	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.0058	0.0017	0.00069	0.00072	0.00081	0.00082
Pyrene	16	16	12.50	12.50	0.0012	0.00106	0.00194	0.0009679	0.0087	0.0045	BG02-SB01 (5 - 6 ft)	BG01-SB02 (5 - 6 ft)	0.00081	0.0023	0.00069	0.00072	0.0008	0.00082

Notes:
All units are in milligrams per kilogram (mg/kg)
If the dataset contains nondetects, summary statistics are censored at the MDL and are estimated by the Kaplan-Meier (KM) method.
If duplicates exist, 1. if the duplicate pair was both detect or both non-detect, the average of the duplicate results was used as a single data point; 2. if the duplicate pair contained a detect and non-detect, the maximum detect was used.
-- = no value; ft = feet; MDL = method detection limit; ND = non-detect; PAH = polycyclic aromatic hydrocarbon; Std = standard.

Data Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is an estimated quantity with an unknown bias.
J+	The result is an estimated quantity, but the result may be biased high.
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UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
U	The result has been evaluated to be undetected at the reporting limit or at the reported concentration; result is considered to be a false positive.

Table 3
Limit of Quantitation (LOQ) Screen Results for Metals
Camp Hero Remedial Investigation
Montauk, New York

	SURFACE SOIL						SUBSURFACE SOIL					
	Montauk Loam (ML)			Whitman Sandy Loam (WSL)			Montauk Loam (ML)			Whitman Sandy Loam (WSL)		
Metal	Percent NDs (%)	Count of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Count of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Count of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Count of Results Below LOQ	Percent Total Results < LOQ
Aluminum	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Antimony	0%	1	7%	0%	2	13%	0%	0	0%	0%	1	6%
Arsenic	0%	3	20%	7%	7	47%	6%	4	25%	6%	4	25%
Barium	0%	0	0%	0%	0	0%	0%	0	0%	0%	1	6%
Beryllium	7%	7	47%	7%	13	87%	6%	13	81%	13%	13	81%
Cadmium	40%	15	100%	33%	13	87%	31%	16	100%	75%	16	100%
Calcium (Ca)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Chromium	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Cobalt	0%	1	7%	0%	1	7%	0%	0	0%	0%	1	6%
Copper	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Iron (Fe)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Lead	0%	7	47%	0%	4	27%	0%	11	69%	0%	16	100%
Magnesium (Mg)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Manganese (Mn)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Nickel	0%	1	7%	0%	3	20%	0%	4	25%	0%	2	13%
Potassium (K)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Selenium	100%	15	100%	100%	15	100%	100%	16	100%	100%	16	100%
Silver	100%	15	100%	87%	14	93%	100%	16	100%	100%	16	100%
Sodium (Na)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Thallium	0%	15	100%	0%	15	100%	6%	12	75%	6%	11	69%
Vanadium	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
Zinc	0%	0	0%	0%	0	0%	6%	1	6%	0%	1	6%

Notes:

LOQ = Limit of Quantitation

ND = non-detect

ML = Montauk Loam

WSL = Whitman Sandy Loam

Table 4
LOQ Screen Results for Polycyclic Aromatic Hydrocarbons (PAHs)
Camp Hero Remedial Investigation
Montauk, New York

	SURFACE SOIL ML and WSL Combined			SUBSURFACE SOIL ML and WSL Combined		
Metal	Percent NDs (%)	Count of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Count of Results Below LOQ	Percent Total Results < LOQ
1-Methylnaphthalene	77%	23	77%	94%	30	94%
2-Methylnaphthalene	50%	15	50%	94%	30	94%
Acenaphthene	70%	21	70%	100%	32	100%
Acenaphthylene	90%	27	90%	100%	32	100%
Anthracene	57%	17	57%	97%	31	97%
Benzo(a)anthracene	20%	6	20%	91%	29	91%
Benzo(a)pyrene	27%	8	27%	91%	29	91%
Benzo(b)fluoranthene	13%	4	13%	91%	29	91%
Benzo(g,h,i)perylene	33%	10	33%	94%	30	94%
Benzo(k)fluoranthene	47%	14	47%	94%	30	94%
Chrysene	23%	7	23%	91%	29	91%
Dibenz(a,h)anthracene	93%	28	93%	100%	32	100%
Fluoranthene	13%	4	13%	88%	28	88%
Fluorene	70%	21	70%	100%	32	100%
Indeno(1,2,3-cd)pyrene	50%	15	50%	97%	31	97%
Naphthalene	47%	14	47%	97%	31	97%
Phenanthrene	10%	3	10%	91%	29	91%
Pyrene	13%	4	13%	88%	28	88%
BaP TEQ	13%	--	--	91%	--	--
HMW PAHs	13%	--	--	88%	--	--
LMW PAHs	0%	--	--	81%	--	--

Notes:
LOQ = Limit of Quantitation
ND = non-detect
ML = Montauk Loam
WSL = Whitman Sandy Loam

Table 5

Low Molecular Weight and High Molecular Weight Polycyclic Aromatic Hydrocarbons

Camp Hero Remedial Investigation

Montauk, New York

LMW PAHs	CAS No	Molecular Weight	HMW PAHs	CAS No	Molecular Weight
1-Methylnaphthalene	90-12-0	142.2	Benzo(a)anthracene	56-55-3	228.3
2-Methylnaphthalene	91-57-6	142.2	Benzo(a)pyrene	50-32-8	252.3
Acenaphthene	83-32-9	154.2	Benzo(b)fluoranthene	205-99-2	252.3
Acenaphthylene	208-96-8	152.2	Benzo(g,h,i)perylene	191-24-2	276.3
Anthracene	120-12-7	178.2	Benzo(k)fluoranthene	207-08-9	252.3
Fluoranthene	206-44-0	202.3	Chrysene	218-01-9	228.3
Fluorene	86-73-7	166.2	Dibenz(a,h)anthracene	53-70-3	278.4
Naphthalene	91-20-3	128.2	Indeno(1,2,3-cd)pyrene	193-39-5	276.3
Phenanthrene	85-01-8	178.2	Pyrene	129-00-0	202.3

Source: USEPA, 2007 and ATSDR, 1995

Table 6

Carcinogenic Polycyclic Aromatic Hydrocarbons and Toxicity Equivalence Factors

Camp Hero Remedial Investigation
Montauk, New York

Carcinogenic PAHs	TEFs
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.01
Chrysene	0.001
Dibenz(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

Source: USEPA, 1993 and 2016

Table 7
PAST Software Permutation Test Results for Surface Soil
Camp Hero Remedial Investigation
Montauk, New York

	Percent Non-Detect		Goodness of Fit (Data Distribution)		Test for Equal Variance		Permutation Tests		Are the Means of ML and WSL Soil Types Equal?
	ML	WSL	ML	WSL	H_0 = The two samples are taken from populations with equal variance		H_0 = The two samples are taken from populations with equal means		$p > 0.05$ accepts H_0
Analyte					p (F-test)	p (Monte Carlo)[1]	p (t-test)	p (Monte Carlo)[1]	
Aluminum	0%	0%	N	AN	0.29095	--	0.46517	--	**Yes**
Antimony	0%	0%	N	G	--	0.0075	--	0.288	**Yes**
Arsenic	0%	7%	N	N	0.1391	--	0.027324	--	**No**
Barium	0%	0%	N	AN	0.83583	--	0.2168	--	**Yes**
Beryllium	7%	7%	N	NP	--	0.0577	--	0.9995	**Yes**
Cadmium	40%	33%	AN	NP	--	0.0888	--	0.0521	**Yes**
Calcium (Ca)	0%	0%	AG	AN	--	0.2412	--	0.0664	**Yes**
Chromium	0%	0%	G	AN	--	0.6817	--	0.9361	**Yes**
Cobalt	0%	0%	N	AG	--	0.0134	--	0.5122	**Yes**
Copper	0%	0%	N	N	0.27312	--	0.082942	--	**Yes**
Iron (Fe)	0%	0%	N	L	--	0.5327	--	0.0405	**No**
Lead	0%	0%	N	G	--	0.8919	--	0.5621	**Yes**
Magnesium (Mg)	0%	0%	N	AN	0.60131	--	0.37169	--	**Yes**
Manganese (Mn)	0%	0%	N	AN	0.73044	--	0.0094494	--	**No**
Nickel	0%	0%	N	AN	0.14859	--	0.83724	--	**Yes**
Potassium (K)	0%	0%	AN	G	--	0.8604	--	0.5246	**Yes**
Selenium	100%	100%	*	*	--	--	--	--	--
Silver	100%	87%	*	*	--	--	--	--	--
Sodium (Na)	0%	0%	L	N	--	0.1093	--	0.0978	**Yes**
Thallium	0%	0%	N	N	0.77634	--	0.69002	--	**Yes**
Vanadium	0%	0%	N	AN	0.16488	--	0.32659	--	**Yes**
Zinc	0%	0%	N	AN	0.28603	--	0.71559	--	**Yes**

Notes:

Data Distribution: * = No Goodness of Fit; AG = Approximate Gamma; AL = Approximate Lognormal; AN = Approximate Normal; G = Gamma; L = Lognormal; N =

-- = Test not applicable

H_0 = null hypothesis

ML = Montauk Loam

WSL = Whitman Sandy Loam

[1] The default PAST setting, n = 9,999, was used to perform Monte Carlo Simulations

Table 8
PAST Software Permutation Test Results for Subsurface Soil
Camp Hero Remedial Investigation
Montauk, New York

	Percent Non-Detect		Goodness of Fit (Data Distribution)		Test for Equal Variance		Permutation Tests		Are the Means of ML and WSL Soil Types Equal?
					H_0 = The two samples are taken from populations with equal variance		H_0 = The two samples are taken from populations with equal means		
	ML	WSL	ML	WSL					$p > 0.05$ accepts H_0
Analyte					p (F-test)	p (Monte Carlo)[1]	p (t-test)	p (Monte Carlo)[1]	
Aluminum	0%	0%	G	N	--	0.0047	--	0.332	**Yes**
Antimony	0%	0%	AL	N	--	0.094	--	0.2693	**Yes**
Arsenic	6%	6%	N	N	0.022938	0.0291	0.15629	0.1558	**Yes**
Barium	0%	0%	L	N	--	0.0439	--	0.3279	**Yes**
Beryllium	6%	13%	G	AN	--	0.4334	--	0.1287	**Yes**
Cadmium	31%	75%	L	N	--	0.8839	--	0.564	**Yes**
Calcium (Ca)	0%	0%	AL	N	--	0.114	--	0.0229	**No**
Chromium	0%	0%	AN	N	0.00048113	0.0111	0.29572	0.3122	**Yes**
Cobalt	0%	0%	AL	N	--	0.0957	--	0.1662	**Yes**
Copper	0%	0%	AN	N	0.025078	0.0806	0.16368	0.1726	**Yes**
Iron (Fe)	0%	0%	AN	N	0.0085396	0.0797	0.10611	0.1027	**Yes**
Lead	0%	0%	AG	N	--	0.0004	--	0.3993	**Yes**
Magnesium (Mg)	0%	0%	AG	N	--	0.0714	--	0.2208	**Yes**
Manganese (Mn)	0%	0%	AG	N	--	0.0909	--	0.1754	**Yes**
Nickel	0%	0%	G	N	--	0.0573	--	0.2956	**Yes**
Potassium (K)	0%	0%	NP	N	--	0.0611	--	0.3952	**Yes**
Selenium	100%	100%	*	*	--	--	--	--	--
Silver	100%	100%	*	*	--	--	--	--	--
Sodium (Na)	0%	0%	NP	N	--	0.0884	--	0.064	**Yes**
Thallium	6%	6%	NP	N	--	0.0361	--	0.499	**Yes**
Vanadium	0%	0%	G	N	--	0.0134	--	0.194	**Yes**
Zinc	6%	0%	G	N	--	0.0044	--	0.3042	**Yes**

Notes:

Data Distribution: * = No Goodness of Fit; AG = Approximate Gamma; AL = Approximate Lognormal; AN = Approximate Normal; G = Gamma; L = Lognormal; N =

-- = Test not applicable

H_0 = null hypothesis

ML = Montauk Loam

WSL = Whitman Sandy Loam

[1] The default PAST setting, n = 9,999, was used to perform Monte Carlo Simulations

Table 9
Permutation Test Results for Surface and Subsurface Soil Using PAST Software
Camp Hero Remedial Investigation
Montauk, New York

		Percent Non-Detect		Goodness of Fit (Data Distribution)		Test for Equal Variance		Permutation Tests		Are the Means of Surface and Subsurface Soil Equal?
		SS[2] n = 30	SO[2] n = 32	SS	SO	H_0 = The two samples are taken from populations with equal variance		H_0 = The two samples are taken from populations with equal means		$p > 0.05$ accepts H_0
Analyte						**p (F-test)**	**p (Monte Carlo)[1]**	**p (t-test)**	**p (Monte Carlo)[1]**	
Aluminum		0%	0%	N	N	0.0275	0.0633	0.3261	0.3292	**Yes**
Antimony		0%	0%	G	G	--	0.0457	--	0.0080	**No**
Arsenic	[3] ML	0%	6%	N	N	0.7066	--	0.6197	--	**Yes**
	WSL	7%	6%	N	N	0.6331	--	0.7038	--	**Yes**
Barium		0%	0%	L	G	--	0.0007	--	0.0333	**No**
Beryllium		7%	9%	*	G	--	0.6620	--	0.3487	**Yes**
Cadmium		37%	53%	*	N	--	0.0923	--	0.0431	**No**
Calcium (Ca)	[3] ML	0%	0%	G	L	--	0.6502	--	0.1811	**Yes**
	WSL	0%	0%	N	N	0.0438	0.3175	--	0.0833	**Yes**
Chromium		0%	0%	G	G	--	0.0853	--	0.2231	**Yes**
Cobalt		0%	0%	N	G	--	0.0355	--	0.0075	**No**
Copper		0%	0%	N	N	0.0005	0.0116	0.1269	0.1316	**Yes**
Iron (Fe)	[3] ML	0%	0%	N	N	0.0012	0.0143	--	0.4351	**Yes**
	WSL	0%	0%	L	N	--	0.4481	--	0.5990	**Yes**
Lead		0%	0%	N	N	0.0100	0.0751	0.0000	0.0001	**No**
Magnesium (Mg)		0%	0%	G	G	--	0.0032	--	0.0020	**No**
Manganese (Mn)	[3] **ML**	0%	0%	N	G	--	0.0092	--	0.0139	**No**
	WSL	0%	0%	N	N	0.0001	0.0011	--	0.0035	**No**
Nickel		0%	0%	N	N	0.0004	0.0522	0.1518	0.1589	**Yes**
Potassium (K)		0%	0%	*	G	--	0.0001	--	0.0001	**No**
Selenium		100%	100%	*	*	--	--	--	--	**Yes**
Silver		93%	100%	*	*	--	--	--	--	**Yes**
Sodium (Na)		0%	0%	L	*	--	0.1787	--	0.0118	**No**
Thallium		0%	6%	N	G	--	0.0003	--	0.0300	**No**
Vanadium		0%	0%	N	G	--	0.0469	--	0.3016	**Yes**
Zinc		0%	3%	N	G	--	0.0603	--	0.8528	**Yes**

Notes:

Data Distribution: * = No Goodness of Fit; G = Gamma; L = Lognormal; N = Normal

-- = Test not applicable

H_0 = null hypothesis

SO = Subsurface Soil; > 2 feet below ground surface

SS = Surface Soil; 0 - 2 feet below ground surface

ML = Montauk Loam

WSL = Whitman Sandy Loam

[1] The default PAST setting, n = 9,999, was used to perform Monte Carlo Simulations

[2] Where soil types are separated, n = 15 for surface soils and n = 16 for subsurface soils

[3] Metals which are separated were previously shown to have statistically different means at either surface or subsurface depths for ML and WSL soil types (Tables 5 and 6); these metals will be not combined when comparing the means of surface and subsurface soil

Table 10
BTV Summary Table for Surface Soil
Camp Hero Remedial Investigation
Montauk, New York

Analytes	Soil Type[1]	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness of Fit Results (5% Significance Level)[2]	Surface Soil Upper Tolerance Limit (UTL)[2]	Surface Soil Upper Prediction Limit (UPL)[23]	UTL Method	UPL Method
Metals (mg/kg)										
Aluminum	--	30	0%	0%	22,000	normal	**23519**	**21059**	95% UTL with 95% Coverage	95% UPL (t)
Antimony	--	30	0%	10%	5.3	gamma	**5.6**	**4.544**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Arsenic	ML	15	0%	20%	4.6	normal	**5.533**	**4.683**	95% UTL with 95% Coverage	95% UPL (t)
	WSL	15	7%	47%	3	normal	**3.729**	**3.156**	95% UTL 95% Coverage	95% KM UPL (t)
Barium	--	30	0%	0%	38	lognormal	**56.3**	**44.95**	95% UTL with 95% Coverage	95% UPL (t)
Beryllium	--	30	7%	67%	4.9	non-parametric	**4.9**	**2.37**	95% UTL with 95% Coverage	95% UPL
Cadmium	--	30	37%	93%	4.1	N/A	**< 0.18 to < 0.22**		Sample LOQ	
Calcium (Ca)	--	30	0%	0%	1,700	gamma	**1014**	**840.7**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Chromium	--	30	0%	0%	30	gamma	**29.14**	**24.45**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Cobalt	--	30	0%	7%	5.5	normal	**4.85**	**4.255**	95% UTL with 95% Coverage	95% UPL (t)
Copper	--	30	0%	0%	41	normal	**45.15**	**40.57**	95% UTL with 95% Coverage	95% UPL (t)
Iron (Fe)	ML	15	0%	0%	20,000	normal	**24828**	**21455**	95% UTL with 95% Coverage	95% UPL (t)
	WSL	15	0%	0%	18,000	lognormal	**33536**	**22307**	95% UTL with 95% Coverage	95% UPL (t)
Lead	--	30	0%	37%	11	normal	**10.14**	**9.013**	95% UTL with 95% Coverage	95% UPL (t)
Magnesium (Mg)	--	30	0%	0%	2,900	gamma	**3186**	**2562**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Manganese (Mn)	ML	15	0%	0%	180	normal	**198.8**	**171.8**	95% UTL with 95% Coverage	95% UPL (t)
	WSL	15	0%	0%	120	normal	**155.6**	**130.8**	95% UTL with 95% Coverage	95% UPL (t)
Nickel	--	30	0%	13%	14	normal	**13.17**	**11.67**	95% UTL with 95% Coverage	95% UPL (t)
Potassium (K)	--	30	0%	0%	940	non-parametric	**940**	**868.5**	95% UTL with 95% Coverage	95% UPL
Selenium	--	30	100%	100%	N/A	N/A	**< 0.84 to < 1.0**		Sample LOD	
Silver	--	30	93%	97%	0.88	N/A	**< 0.72 to < 0.88**		Sample LOQ	
Sodium (Na)	--	30	0%	0%	200	lognormal	**122.5**	**105.1**	95% UTL with 95% Coverage	95% UPL (t)
Thallium	--	30	0%	100%	0.15	N/A	**< 0.14 to < 0.18**		Sample LOQ	
Vanadium	--	30	0%	0%	30	normal	**33.43**	**30.07**	95% UTL with 95% Coverage	95% UPL (t)
Zinc	--	30	0%	0%	39	normal	**32.06**	**28.56**	95% UTL with 95% Coverage	95% UPL (t)
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)										
1-Methylnaphthalene	--	30	77%	77%	0.0086	normal	**0.00578**	**0.00483**	95% UTL 95% Coverage	95% KM UPL (t)
2-Methylnaphthalene	--	30	50%	50%	0.0068	non-parametric	**0.016**	**0.0119**	95% UTL with 95% Coverage	95% UPL
Acenaphthene	--	30	70%	70%	0.025	gamma	**0.0305**	**0.0236**	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
Acenaphthylene	--	30	90%	90%	0.012	N/A	**< 0.00072 to < 0.016**		Sample LOQ	
Anthracene	--	30	57%	57%	0.065	gamma	**0.0481**	**0.0348**	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
Benzo(a)anthracene	--	30	20%	20%	0.22	gamma	**0.138**	**0.0894**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
Benzo(a)pyrene	--	30	27%	27%	0.53	lognormal	**0.247**	**0.0992**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
Benzo(b)fluoranthene	--	30	13%	13%	0.3	lognormal	**0.334**	**0.14**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
Benzo(g,h,i)perylene	--	30	33%	33%	0.1	lognormal	**0.0664**	**0.0323**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)

Table 10
BTV Summary Table for Surface Soil
Camp Hero Remedial Investigation
Montauk, New York

Analytes	Soil Type[1]	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness of Fit Results (5% Significance Level)[2]	Surface Soil Upper Tolerance Limit (UTL)[2]	Upper Prediction Limit (UPL)[23]	UTL Method	UPL Method
Benzo(k)fluoranthene	--	30	47%	47%	0.44	lognormal	**0.12**	**0.052**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
Chrysene	--	30	23%	23%	0.2	gamma	**0.13**	**0.0839**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
Dibenz(a,h)anthracene	--	30	93%	93%	0.021	N/A	**< 0.00072 to < 0.016**		Sample LOQ	
Fluoranthene	--	30	13%	13%	0.57	lognormal	**0.733**	**0.274**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
Fluorene	--	30	70%	70%	0.03	gamma	**0.0304**	**0.0236**	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
Indeno(1,2,3-cd)pyrene	--	30	50%	50%	0.36	lognormal	**0.298**	**0.0848**	95% UTL 95% Coverage (ROS, WH)	95% UPL (t) (ROS, WH)
Naphthalene	--	30	47%	47%	0.0057	non-parametric	**0.016**	**0.0119**	95% UTL with 95% Coverage	95% UPL
Phenanthrene	--	30	10%	10%	0.31	lognormal	**0.362**	**0.147**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
Pyrene	--	30	13%	13%	0.43	gamma	**0.278**	**0.178**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
Total PAHs (mg/kg)										
LMW PAHs	--	30	0%	--	1.028	non-parametric	**1.026**	**1.021**	95% UTL with 95% Coverage	95% UPL
HMW PAHs	--	30	13%	--	2.563	lognormal	**1.791**	**0.764**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
Total BaP TEQ (mg/kg)										
BaP TEQ	--	30	13%	--	0.642	lognormal	**0.493**	**0.173**	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)

Notes:
All units in milligrams per kilogram (mg/kg)
-- = Not Calculated
N/A = Not Applicable
ND = Not-Detected or Non-Detect
ML = Montauk Loam
WSL = Whitman Sandy Loam
LMW = Low Molecular Weight
HMW = High Molecular Weight
BaP TEQ = benzo(a)pyrene Toxicity Equivalent
LOD = Limit of Detection
LOQ = Limit of Quantitation
UTL = Upper Tolerance Limit
UPL = Upper Prediction Limit
Value in Max Detect column not including max RDL which is higher than the max detect in many instances for PAHs
[1] ML and WSL soil types combined based on results of permutation tests, unless otherwise noted
[2] EPA's ProUCL software (Version 5.1) was used to calculate Goodness of Fit and BTVs for each analyte
[3] The default setting, k = 1, was used for number of future observations

Table 11
BTV Summary Table for Subsurface Soil
Camp Hero Remedial Investigation
Montauk, New York

Analytes	Soil Type[1]	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness of Fit Results (5% Significance Level)[2]	Subsurface Soil Upper Tolerance Limit (UTL)[2]	Upper Prediction Limit (UPL)[23]	UTL Method	UPL Method
Metals (mg/kg)										
Aluminum	--	32	0%	0%	31,000	normal	**27329**	**23821**	95% UTL with 95% Coverage	95% UPL (t)
Antimony	--	32	0%	3%	9.8	gamma	**10.3**	**8.274**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Arsenic	--	32	6%	25%	5	normal	**4.334**	**3.857**	95% UTL 95% Coverage	95% KM UPL (t)
Barium	--	32	0%	3%	140	gamma	**121.5**	**94.24**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Beryllium	--	32	9%	81%	0.63	gamma	**0.451**	**0.344**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
Cadmium	--	32	53%	100%	0.08	N/A	**< 0.17 to < 0.20**		Sample LOQ	
Calcium (Ca)	ML	16	0%	0%	2,500	lognormal	**2677**	**1776**	95% UTL with 95% Coverage	95% UPL (t)
	WSL	16	0%	0%	960	normal	**926.8**	**788.5**	95% UTL with 95% Coverage	95% UPL (t)
Chromium	--	32	0%	0%	41	gamma	**43.69**	**35.32**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Cobalt	--	32	0%	3%	9.8	gamma	**10.24**	**8.242**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Copper	--	32	0%	0%	76	normal	**70.15**	**61.67**	95% UTL with 95% Coverage	95% UPL (t)
Iron (Fe)	--	32	0%	0%	38,000	gamma	**38926**	**31038**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Lead	--	32	0%	84%	5.8	normal	**5.876**	**5.217**	95% UTL with 95% Coverage	95% UPL (t)
Magnesium (Mg)	--	32	0%	0%	8,800	gamma	**8315**	**6430**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Manganese (Mn)	--	32	0%	0%	760	gamma	**656.8**	**512.9**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Nickel	--	32	0%	19%	25	normal	**21.28**	**18.5**	95% UTL with 95% Coverage	95% UPL (t)
Potassium (K)	--	32	0%	0%	6,100	gamma	**5660**	**4288**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Selenium	--	32	100%	100%	N/A	N/A	**< 0.77 to <0.95**		Sample LOD	
Silver	--	32	100%	100%	N/A	N/A	**<0.054 to < 0.066**		Sample LOD	
Sodium (Na)	--	32	0%	0%	320	non-parametric	**320**	**248.5**	95% UTL with 95% Coverage	95% UPL
Thallium	--	32	6%	72%	0.45	gamma	**0.414**	**0.328**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
Vanadium	--	32	0%	0%	60	gamma	**60.91**	**49.14**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Zinc	--	32	3%	6%	50	gamma	**54.2**	**42.59**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)										
1-Methylnaphthalene	--	32	94%	94%	0.00096	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
2-Methylnaphthalene	--	32	94%	94%	0.0021	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Acenaphthene	--	32	100%	100%	N/A	N/A	**< 0.00069 to <0.00082**		Sample LOD	
Acenaphthylene	--	32	100%	100%	N/A	N/A	**< 0.00069 to <0.00082**		Sample LOD	
Anthracene	--	32	97%	97%	0.00081	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Benzo(a)anthracene	--	32	91%	91%	0.0026	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Benzo(a)pyrene	--	32	91%	91%	0.0017	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Benzo(b)fluoranthene	--	32	91%	91%	0.0029	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Benzo(g,h,i)perylene	--	32	94%	94%	0.0013	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Benzo(k)fluoranthene	--	32	94%	94%	0.0012	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Chrysene	--	32	91%	91%	0.0019	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Dibenz(a,h)anthracene	--	32	100%	100%	N/A	N/A	**< 0.00069 to <0.00082**		Sample LOD	
Fluoranthene	--	32	88%	88%	0.005	N/A	**< 0.00069 to <0.00082**		Sample LOQ	

Table 11
BTV Summary Table for Subsurface Soil
Camp Hero Remedial Investigation
Montauk, New York

Analytes	Soil Type[1]	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness of Fit Results (5% Significance Level)[2]	Subsurface Soil Upper Tolerance Limit (UTL)[2]	Subsurface Soil Upper Prediction Limit (UPL)[23]	UTL Method	UPL Method
Fluorene	--	32	100%	100%	N/A	N/A	**< 0.00069 to <0.00082**		Sample LOD	
Indeno(1,2,3-cd)pyrene	--	32	97%	97%	0.0011	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Naphthalene	--	32	97%	97%	0.0012	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Phenanthrene	--	32	91%	91%	0.0038	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Pyrene	--	32	88%	88%	0.0045	N/A	**< 0.00069 to <0.00082**		Sample LOQ	
Total PAHs (mg/kg)										
LMW PAHs	--	32	81%	--	0.0204	normal	**0.0134**	**0.012**	95% UTL 95% Coverage	95% KM UPL (t)
HMW PAHs	--	32	88%	--	0.0339	normal	**0.0189**	**0.0165**	95% UTL 95% Coverage	95% KM UPL (t)
Total BaP TEQ (mg/kg)										
BaP TEQ	--	32	91%	--	0.00576	non-parametric	**0.00296**	**0.00263**	95% UTL with 95% Coverage	95% KM UPL (t)

Notes:
All units in milligrams per kilogram (mg/kg)
-- = Not Calculated
N/A = Not Applicable
ND = Not-Detected or Non-Detect
ML = Montauk Loam
WSL = Whitman Sandy Loam
LMW = Low Molecular Weight
HMW = High Molecular Weight
BaP TEQ = benzo(a)pyrene Toxicity Equivalent
LOD = Limit of Detection
LOQ = Limit of Quantitation
UTL = Upper Tolerance Limit
UPL = Upper Prediction Limit
Value in Max Detect column not including max RDL which is higher than the max detect in many instances for PAHs
[1] ML and WSL soil types combined based on results of permutation tests, unless otherwise noted
[2] EPA's ProUCL software (Version 5.1) was used to calculate Goodness of Fit and BTVs for each analyte
[3] The default setting, k = 1, was used for number of future observations

Table 12
BTV Summary Table for Metals - Combined
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Soil Type[1]	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness of Fit Results (5% Significance Level)[2]	Upper Tolerance Limit (UTL)[2]	Upper Prediction Limit (UPL)[23]	UTL Method[4]	UPL Method
Metals (mg/kg)										
Aluminum	--	62	0%	0%	31,000	gamma	**27822**	**24220**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Arsenic	ML	31	3%	23%	5	normal	**5.064**	**4.507**	95% UTL 95% Coverage	95% KM UPL (t)
	WSL	31	6%	35%	3	normal	**3.383**	**3.042**	95% UTL 95% Coverage	95% KM UPL (t)
Beryllium	--	62	8%	74%	4.9	lognormal	**0.815**	**0.574**	95% KM UTL (Lognormal)95% Coverage	95% KM UPL (Lognormal)
Calcium (Ca)	ML	31	0%	0%	2,500	non-parametric	**2500**	**2020**	95% UTL with 95% Coverage	95% UPL
	WSL	31	0%	0%	960	normal	**751.8**	**674.1**	95% UTL with 95% Coverage	95% UPL (t)
Chromium	--	62	0%	0%	41	gamma	**33.92**	**29.54**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Copper	--	62	0%	0%	76	normal	**57.2**	**52.37**	95% UTL with 95% Coverage	95% UPL (t)
Iron (Fe)	ML	31	0%	0%	38,000	gamma	**37927**	**31025**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
	WSL	31	0%	0%	19,000	non-parametric	**19000**	**18400**	95% UTL with 95% Coverage	95% UPL
Nickel	--	62	0%	16%	25	gamma	**18.21**	**15.75**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Selenium	--	62	100%	100%	N/A	N/A	**< 0.77 to < 1.0**		Sample LOD	
Silver	--	62	97%	98%	N/A	N/A	**< 0.66 to < 0.88**		Sample LOQ	
Vanadium	--	62	0%	0%	60	gamma	**46.28**	**40.48**	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
Zinc	--	62	2%	3%	50	gamma	**42.36**	**36.5**	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)

Notes:

All units in milligrams per kilogram (mg/kg)

-- = Not Calculated

N/A = Not Applicable

ND = Not-Detected or Non-Detect

ML = Montauk Loam

WSL = Whitman Sandy Loam

KM = Kaplan-Meier

LOD = Limit of Detection

LOQ = Limit of Quantitation

SO = Subsurface Soil

SS = Surface Soil

UTL = Upper Tolerance Limit

UPL = Upper Prediction Limit

WH = Wilson Hilferty

[1] ML and WSL soil types combined based on results of permutation tests, unless otherwise noted

[2] EPA's ProUCL software (Version 5.1) was used to calculate Goodness of Fit and BTVs for each analyte

[3] The default setting, k = 1, was used for number of future observations

[4] KM UTLs were chosen when available for censored datasets

Table 13
Selected Soil BTVs for Metals and PAHs
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Soil Type[1]	Upper Tolerance Limit (UTL) Surface Soil[2]	Upper Tolerance Limit (UTL) Subsurface Soil[2]	Upper Tolerance Limit (UTL) Depths Combined[2]
Metals (mg/kg)				
Aluminum	--	23,519	27,329	27,822
Antimony	--	5.6	10.3	--
Arsenic	ML	5.533	4.334	5.064
	WSL	3.729		3.383
Barium	--	56.3	121.5	--
Beryllium	--	4.9	0.451	0.815
Cadmium	--	< 0.18 to < 0.22	< 0.17 to < 0.20	--
Calcium (Ca)	ML	1,014	2,677	2,500
	WSL		926.8	751.8
Chromium	--	29.14	43.69	33.92
Cobalt	--	4.85	10.24	--
Copper	--	45.15	70.15	57.2
Iron (Fe)	ML	24,828	38,926	37,927
	WSL	33,536		19,000
Lead	--	10.14	5.876	--
Magnesium (Mg)	--	3,186	8,315	--
Manganese (Mn)	ML	198.8	656.8	--
	WSL	155.6		
Nickel	--	13.17	21.28	18.21
Potassium (K)	--	940	5660	--
Selenium	--	< 0.84 to < 1.0	< 0.77 to <0.95	< 0.77 to < 1.0
Silver	--	< 0.72 to < 0.88	<0.054 to < 0.066	< 0.66 to < 0.88
Sodium (Na)	--	122.5	320	--
Thallium	--	< 0.14 to < 0.18	0.414	--
Vanadium	--	33.43	60.91	46.28
Zinc	--	32.06	54.2	42.36
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg) [3]				
1-Methylnaphthalene	--	0.00578	< 0.00069 to <0.00082	--
2-Methylnaphthalene	--	0.016	< 0.00069 to <0.00082	--
Acenaphthene	--	0.0305	< 0.00069 to <0.00082	--
Acenaphthylene	--	< 0.00072 to < 0.016	< 0.00069 to <0.00082	--
Anthracene	--	0.0481	< 0.00069 to <0.00082	--

Table 13
Selected Soil BTVs for Metals and PAHs
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Soil Type[1]	Upper Tolerance Limit (UTL) Surface Soil[2]	Upper Tolerance Limit (UTL) Subsurface Soil[2]	Upper Tolerance Limit (UTL) Depths Combined[2]
Benzo(a)anthracene	--	0.138	< 0.00069 to <0.00082	--
Benzo(a)pyrene	--	0.247	< 0.00069 to <0.00082	--
Benzo(b)fluoranthene	--	0.334	< 0.00069 to <0.00082	--
Benzo(g,h,i)perylene	--	0.0664	< 0.00069 to <0.00082	--
Benzo(k)fluoranthene	--	0.12	< 0.00069 to <0.00082	--
Chrysene	--	0.13	< 0.00069 to <0.00082	--
Dibenz(a,h)anthracene	--	< 0.00072 to < 0.016	< 0.00069 to <0.00082	--
Fluoranthene	--	0.733	< 0.00069 to <0.00082	--
Fluorene	--	0.0304	< 0.00069 to <0.00082	--
Indeno(1,2,3-cd)pyrene	--	0.298	< 0.00069 to <0.00082	--
Naphthalene	--	0.016	< 0.00069 to <0.00082	--
Phenanthrene	--	0.362	< 0.00069 to <0.00082	--
Pyrene	--	0.278	< 0.00069 to <0.00082	--
Total PAHs (mg/kg)				
LMW PAHs	--	1.026	0.0134	--
HMW PAHs	--	1.791	0.0189	--
Total BaP TEQ (mg/kg)				
BaP TEQ	--	0.493	0.00296	--

Notes:

All units in milligrams per kilogram (mg/kg)

BTV = Background Threshold Value

N/A = Not Applicable

ML = Montauk Loam

WSL = Whitman Sandy Loam

UTL = Upper Tolerance Limit

[1] ML and WSL soil types combined based on results of permutation tests, unless otherwise noted

[2] EPA's ProUCL software (Version 5.1) was used to calculate BTVs for each analyte

[3] Subsurface soil BTVs and combined soil BTVs were not calculated for PAHs due to the high number of NDs in the subsurface soil data set.

Attachment E

ProUCL BTV Output Files

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ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Background Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/2/2016 10:51:30 AM
From File	ProUCL_Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|aluminum|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	25
Minimum	2700	First Quartile	5100
Second Largest	29000	Median	9525
Maximum	31000	Third Quartile	14250
Mean	10817	SD	7553
Coefficient of Variation	0.698	Skewness	1.263
Mean of logged Data	9.061	SD of logged Data	0.696

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	27329	90% Percentile (z)	20496
95% UPL (t)	23821	95% Percentile (z)	23240
95% USL	31763	99% Percentile (z)	28387

Gamma GOF Test

A-D Test Statistic	0.407	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.137	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.347	k star (bias corrected MLE)	2.148
Theta hat (MLE)	4608	Theta star (bias corrected MLE)	5036
nu hat (MLE)	150.2	nu star (bias corrected)	137.5
MLE Mean (bias corrected)	10817	MLE Sd (bias corrected)	7381

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	25555	90% Percentile	20690
95% Hawkins Wixley (HW) Approx. Gamma UPL	26083	95% Percentile	25089

95% WH Approx. Gamma UTL with 95% Coverage	31931	99% Percentile	34805
95% HW Approx. Gamma UTL with 95% Coverage	33209		
95% WH USL	41404	95% HW USL	44196

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	39458	90% Percentile (z)	21019
95% UPL (t)	28557	95% Percentile (z)	27067
95% USL	59378	99% Percentile (z)	43500

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	31000
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	31000	95% BCA Bootstrap UTL with 95% Coverage	31000
95% UPL	29700	90% Percentile	18800
90% Chebyshev UPL	33827	95% Percentile	27900
95% Chebyshev UPL	44249	99% Percentile	30380
95% USL	31000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|antimony|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	27
Minimum	0.72	First Quartile	1.738
Second Largest	9.7	Median	2.7
Maximum	9.8	Third Quartile	4.725
Mean	3.557	SD	2.548
Coefficient of Variation	0.716	Skewness	1.375
Mean of logged Data	1.051	SD of logged Data	0.663

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	9.127	90% Percentile (z)	6.822
95% UPL (t)	7.944	95% Percentile (z)	7.748
95% USL	10.62	99% Percentile (z)	9.484

Gamma GOF Test

A-D Test Statistic	0.727	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.448	k star (bias corrected MLE)	2.24
Theta hat (MLE)	1.453	Theta star (bias corrected MLE)	1.588
nu hat (MLE)	156.7	nu star (bias corrected)	143.3
MLE Mean (bias corrected)	3.557	MLE Sd (bias corrected)	2.377

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	8.274	90% Percentile	6.738
95% Hawkins Wixley (HW) Approx. Gamma UPL	8.389	95% Percentile	8.144
95% WH Approx. Gamma UTL with 95% Coverage	10.3	99% Percentile	11.24
95% HW Approx. Gamma UTL with 95% Coverage	10.62		
95% WH USL	13.31	95% HW USL	14.06

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.089	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	12.18	90% Percentile (z)	6.686
95% UPL (t)	8.951	95% Percentile (z)	8.506
95% USL	17.96	99% Percentile (z)	13.36

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	9.8
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	9.8	95% BCA Bootstrap UTL with 95% Coverage	9.8
95% UPL	9.735	90% Percentile	8.12
90% Chebyshev UPL	11.32	95% Percentile	9.315
95% Chebyshev UPL	14.83	99% Percentile	9.769

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

95% USL	9.8

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|arsenic|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	24		
Number of Detects	30	Number of Non-Detects	2
Number of Distinct Detects	22	Number of Distinct Non-Detects	2
Minimum Detect	0.74	Minimum Non-Detect	0.56
Maximum Detect	5	Maximum Non-Detect	0.57
Variance Detected	0.996	Percent Non-Detects	6.25%
Mean Detected	2.188	SD Detected	0.998
Mean of Detected Logged Data	0.678	SD of Detected Logged Data	0.48

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.086	KM SD	1.029
95% UTL95% Coverage	4.334	95% KM UPL (t)	3.857
90% KM Percentile (z)	3.404	95% KM Percentile (z)	3.778
99% KM Percentile (z)	4.479	95% KM USL	4.938

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.068	SD	1.073
95% UTL95% Coverage	4.414	95% UPL (t)	3.916
90% Percentile (z)	3.444	95% Percentile (z)	3.833
99% Percentile (z)	4.565	95% USL	5.044

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.33	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.946	k star (bias corrected MLE)	4.473
Theta hat (MLE)	0.442	Theta star (bias corrected MLE)	0.489
nu hat (MLE)	296.7	nu star (bias corrected)	268.4
MLE Mean (bias corrected)	2.188		
MLE Sd (bias corrected)	1.034	95% Percentile of Chisquare (2kstar)	16.84

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.434	Mean	2.078
Maximum	5	Median	2
SD	1.057	CV	0.509
k hat (MLE)	3.543	k star (bias corrected MLE)	3.232
Theta hat (MLE)	0.586	Theta star (bias corrected MLE)	0.643
nu hat (MLE)	226.8	nu star (bias corrected)	206.9
MLE Mean (bias corrected)	2.078	MLE Sd (bias corrected)	1.156
95% Percentile of Chisquare (2kstar)	13.28	90% Percentile	3.628
95% Percentile	4.269	99% Percentile	5.654

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	5.247	5.475	95% Approx. Gamma UPL	4.341	4.458
95% Gamma USL	6.562	6.999			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.086	SD (KM)	1.029
Variance (KM)	1.058	SE of Mean (KM)	0.185
k hat (KM)	4.112	k star (KM)	3.748
nu hat (KM)	263.2	nu star (KM)	239.8
theta hat (KM)	0.507	theta star (KM)	0.557
80% gamma percentile (KM)	2.898	90% gamma percentile (KM)	3.53
95% gamma percentile (KM)	4.114	99% gamma percentile (KM)	5.365

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	5.048	5.227	95% Approx. Gamma UPL	4.209	4.298
95% KM Gamma Percentile	4.08	4.157	95% Gamma USL	6.257	6.606

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.091	Mean in Log Scale	0.609
SD in Original Scale	1.037	SD in Log Scale	0.539

95% UTL95% Coverage	5.972	95% BCA UTL95% Coverage	5
95% Bootstrap (%) UTL95% Coverage	5	95% UPL (t)	4.649
90% Percentile (z)	3.667	95% Percentile (z)	4.46
99% Percentile (z)	6.441	95% USL	8.196

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.6	95% KM UTL (Lognormal)95% Coverage	6.048
KM SD of Logged Data	0.549	95% KM UPL (Lognormal)	4.687
95% KM Percentile Lognormal (z)	4.493	95% KM USL (Lognormal)	8.347

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.068	Mean in Log Scale	0.557
SD in Original Scale	1.073	SD in Log Scale	0.666
95% UTL95% Coverage	7.484	95% UPL (t)	5.493
90% Percentile (z)	4.097	95% Percentile (z)	5.219
99% Percentile (z)	8.216	95% USL	11.06

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	5
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	4.35
95% USL	5	95% KM Chebyshev UPL	6.639

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|barium|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
Minimum	5.3	First Quartile	14.38
Second Largest	110	Median	25
Maximum	140	Third Quartile	43.75
Mean	35.83	SD	32.56
Coefficient of Variation	0.909	Skewness	1.834
Mean of logged Data	3.247	SD of logged Data	0.818

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.783	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	107	90% Percentile (z)	77.56
95% UPL (t)	91.89	95% Percentile (z)	89.39
95% USL	126.1	99% Percentile (z)	111.6

Gamma GOF Test

A-D Test Statistic	0.595	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.125	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.158	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.655	k star (bias corrected MLE)	1.52
Theta hat (MLE)	21.65	Theta star (bias corrected MLE)	23.57
nu hat (MLE)	105.9	nu star (bias corrected)	97.3
MLE Mean (bias corrected)	35.83	MLE Sd (bias corrected)	29.06

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	94.24	90% Percentile	74.41
95% Hawkins Wixley (HW) Approx. Gamma UPL	95.9	95% Percentile	92.91
95% WH Approx. Gamma UTL with 95% Coverage	121.5	99% Percentile	134.6
95% HW Approx. Gamma UTL with 95% Coverage	126.5		
95% WH USL	162.8	95% HW USL	174.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0997	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	153.9	90% Percentile (z)	73.39
95% UPL (t)	105.2	95% Percentile (z)	98.8
95% USL	248.8	99% Percentile (z)	172.6

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	140
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	140	95% BCA Bootstrap UTL with 95% Coverage	123.5
95% UPL	120.5	90% Percentile	73.3
90% Chebyshev UPL	135	95% Percentile	110
95% Chebyshev UPL	180	99% Percentile	130.7
95% USL	140		

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|beryllium|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	28		
Number of Detects	29	Number of Non-Detects	3
Number of Distinct Detects	25	Number of Distinct Non-Detects	3
Minimum Detect	0.023	Minimum Non-Detect	0.0092
Maximum Detect	0.63	Maximum Non-Detect	0.01
Variance Detected	0.0151	Percent Non-Detects	9.375%
Mean Detected	0.135	SD Detected	0.123
Mean of Detected Logged Data	-2.3	SD of Detected Logged Data	0.771

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.739	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.123	KM SD	0.121
95% UTL95% Coverage	0.387	95% KM UPL (t)	0.331
90% KM Percentile (z)	0.278	95% KM Percentile (z)	0.322
99% KM Percentile (z)	0.404	95% KM USL	0.458

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.123	SD	0.123
95% UTL95% Coverage	0.392	95% UPL (t)	0.334
90% Percentile (z)	0.28	95% Percentile (z)	0.325
99% Percentile (z)	0.409	95% USL	0.464

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.448	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.145	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.165	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.839	k star (bias corrected MLE)	1.672
Theta hat (MLE)	0.0733	Theta star (bias corrected MLE)	0.0806

nu hat (MLE)	106.7	nu star (bias corrected)	96.97
MLE Mean (bias corrected)	0.135		
MLE Sd (bias corrected)	0.104	95% Percentile of Chisquare (2kstar)	8.403

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.123
Maximum	0.63	Median	0.0975
SD	0.123	CV	0.995
k hat (MLE)	1.329	k star (bias corrected MLE)	1.225
Theta hat (MLE)	0.0926	Theta star (bias corrected MLE)	0.1
nu hat (MLE)	85.06	nu star (bias corrected)	78.42
MLE Mean (bias corrected)	0.123	MLE Sd (bias corrected)	0.111
95% Percentile of Chisquare (2kstar)	6.838	90% Percentile	0.27
95% Percentile	0.344	99% Percentile	0.513

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.457	0.49	95% Approx. Gamma UPL	0.348	0.362
95% Gamma USL	0.625	0.697			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.123	SD (KM)	0.121
Variance (KM)	0.0146	SE of Mean (KM)	0.0217
k hat (KM)	1.04	k star (KM)	0.963
nu hat (KM)	66.54	nu star (KM)	61.63
theta hat (KM)	0.118	theta star (KM)	0.128
80% gamma percentile (KM)	0.199	90% gamma percentile (KM)	0.286
95% gamma percentile (KM)	0.374	99% gamma percentile (KM)	0.577

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.451	0.484	95% Approx. Gamma UPL	0.344	0.357
95% KM Gamma Percentile	0.328	0.339	95% Gamma USL	0.616	0.687

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.105	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.124	Mean in Log Scale	-2.466
SD in Original Scale	0.122	SD in Log Scale	0.901
95% UTL95% Coverage	0.609	95% BCA UTL95% Coverage	0.63
95% Bootstrap (%) UTL95% Coverage	0.63	95% UPL (t)	0.401

90% Percentile (z)	0.269	95% Percentile (z)	0.374
99% Percentile (z)	0.691	95% USL	1.033

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.524	95% KM UTL (Lognormal)95% Coverage	0.717
KM SD of Logged Data	1.002	95% KM UPL (Lognormal)	0.45
95% KM Percentile Lognormal (z)	0.417	95% KM USL (Lognormal)	1.292

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.123	Mean in Log Scale	-2.585
SD in Original Scale	0.123	SD in Log Scale	1.162
95% UTL95% Coverage	0.957	95% UPL (t)	0.558
90% Percentile (z)	0.334	95% Percentile (z)	0.51
99% Percentile (z)	1.126	95% USL	1.893

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	0.63
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.441
95% USL	0.63	95% KM Chebyshev UPL	0.657

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|calcium (ca)|ml|)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
Minimum	250	First Quartile	480
Second Largest	1400	Median	535
Maximum	2500	Third Quartile	740
Mean	755	SD	562.6
Coefficient of Variation	0.745	Skewness	2.301
Mean of logged Data	6.448	SD of logged Data	0.572

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.524	d2max (for USL)	2.443

Normal GOF Test

Shapiro Wilk Test Statistic	0.708	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	2175	90% Percentile (z)	1476
95% UPL (t)	1772	95% Percentile (z)	1680
95% USL	2129	99% Percentile (z)	2064

Gamma GOF Test

A-D Test Statistic	1.145	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.302	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.217	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.959	k star (bias corrected MLE)	2.446
Theta hat (MLE)	255.2	Theta star (bias corrected MLE)	308.7
nu hat (MLE)	94.67	nu star (bias corrected)	78.26
MLE Mean (bias corrected)	755	MLE Sd (bias corrected)	482.8

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1737	90% Percentile	1402
95% Hawkins Wixley (HW) Approx. Gamma UPL	1741	95% Percentile	1683
95% WH Approx. Gamma UTL with 95% Coverage	2365	99% Percentile	2299
95% HW Approx. Gamma UTL with 95% Coverage	2419		
95% WH USL	2288	95% HW USL	2335

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.263	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	2677	90% Percentile (z)	1315
95% UPL (t)	1776	95% Percentile (z)	1619
95% USL	2556	99% Percentile (z)	2391

Nonparametric Distribution Free Background Statistics

Data appear Approximate Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	16	95% UTL with 95% Coverage	2500
Approx, f used to compute achieved CC	0.842	Approximate Actual Confidence Coefficient achieved by UTL	0.56
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	2500	95% BCA Bootstrap UTL with 95% Coverage	2500
95% UPL	2500	90% Percentile	1300
90% Chebyshev UPL	2495	95% Percentile	1675
95% Chebyshev UPL	3283	99% Percentile	2335
95% USL	2500		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers

and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|calcium (ca)|wsl|)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Minimum	170	First Quartile	303.8
Second Largest	730	Median	420
Maximum	960	Third Quartile	515
Mean	440	SD	192.9
Coefficient of Variation	0.438	Skewness	1.402
Mean of logged Data	6.005	SD of logged Data	0.415

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.524	d2max (for USL)	2.443

Normal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	926.8	90% Percentile (z)	687.2
95% UPL (t)	788.5	95% Percentile (z)	757.2
95% USL	911.2	99% Percentile (z)	888.7

Gamma GOF Test

A-D Test Statistic	0.278	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.129	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.299	k star (bias corrected MLE)	5.16
Theta hat (MLE)	69.85	Theta star (bias corrected MLE)	85.28
nu hat (MLE)	201.6	nu star (bias corrected)	165.1
MLE Mean (bias corrected)	440	MLE Sd (bias corrected)	193.7

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	818.2	90% Percentile	699.3
95% Hawkins Wixley (HW) Approx. Gamma UPL	825.9	95% Percentile	799.3
95% WH Approx. Gamma UTL with 95% Coverage	1030	99% Percentile	1010
95% HW Approx. Gamma UTL with 95% Coverage	1054		
95% WH USL	1005	95% HW USL	1026

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**

5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.12	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.213	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	1155	90% Percentile (z)	690.1
95% UPL (t)	858.1	95% Percentile (z)	802.3
95% USL	1117	99% Percentile (z)	1064

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	16	95% UTL with 95% Coverage	960
Approx, f used to compute achieved CC	0.842	Approximate Actual Confidence Coefficient achieved by UTL	0.56
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	960	95% BCA Bootstrap UTL with 95% Coverage	960
95% UPL	960	90% Percentile	635
90% Chebyshev UPL	1036	95% Percentile	787.5
95% Chebyshev UPL	1307	99% Percentile	925.5
95% USL	960		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|chromium|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	24
Minimum	3.2	First Quartile	8.575
Second Largest	40	Median	13.75
Maximum	41	Third Quartile	18.25
Mean	15.53	SD	10.29
Coefficient of Variation	0.663	Skewness	1.328
Mean of logged Data	2.542	SD of logged Data	0.656

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	38.04	90% Percentile (z)	28.73

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

95% UPL (t)	33.26	95% Percentile (z)	32.47
95% USL	44.08	99% Percentile (z)	39.48

Gamma GOF Test

A-D Test Statistic	0.476	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.112	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.646	k star (bias corrected MLE)	2.418
Theta hat (MLE)	5.872	Theta star (bias corrected MLE)	6.424
nu hat (MLE)	169.3	nu star (bias corrected)	154.8
MLE Mean (bias corrected)	15.53	MLE Sd (bias corrected)	9.989

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	35.32	90% Percentile	28.91
95% Hawkins Wixley (HW) Approx. Gamma UPL	36	95% Percentile	34.74
95% WH Approx. Gamma UTL with 95% Coverage	43.69	99% Percentile	47.53
95% HW Approx. Gamma UTL with 95% Coverage	45.3		
95% WH USL	56.03	95% HW USL	59.51

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0998	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	53.3	90% Percentile (z)	29.45
95% UPL (t)	39.31	95% Percentile (z)	37.37
95% USL	78.34	99% Percentile (z)	58.43

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	41
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	41	95% BCA Bootstrap UTL with 95% Coverage	41
95% UPL	40.35	90% Percentile	34.5
90% Chebyshev UPL	46.9	95% Percentile	38.9
95% Chebyshev UPL	61.1	99% Percentile	40.69
95% USL	41		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data

represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|cobalt|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	28
Minimum	0.7	First Quartile	1.775
Second Largest	9.6	Median	2.725
Maximum	9.8	Third Quartile	4.875
Mean	3.573	SD	2.534
Coefficient of Variation	0.709	Skewness	1.406
Mean of logged Data	1.062	SD of logged Data	0.653

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	9.113	90% Percentile (z)	6.821
95% UPL (t)	7.936	95% Percentile (z)	7.741
95% USL	10.6	99% Percentile (z)	9.468

Gamma GOF Test

A-D Test Statistic	0.765	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.514	k star (bias corrected MLE)	2.299
Theta hat (MLE)	1.421	Theta star (bias corrected MLE)	1.554
nu hat (MLE)	160.9	nu star (bias corrected)	147.2
MLE Mean (bias corrected)	3.573	MLE Sd (bias corrected)	2.357

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	8.242	90% Percentile	6.728
95% Hawkins Wixley (HW) Approx. Gamma UPL	8.354	95% Percentile	8.116
95% WH Approx. Gamma UTL with 95% Coverage	10.24	99% Percentile	11.17
95% HW Approx. Gamma UTL with 95% Coverage	10.55		
95% WH USL	13.2	95% HW USL	13.92

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0919	**Lilliefors Lognormal GOF Test**

5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	12.06	90% Percentile (z)	6.679
95% UPL (t)	8.906	95% Percentile (z)	8.469
95% USL	17.7	99% Percentile (z)	13.22

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	9.8
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	9.8	95% BCA Bootstrap UTL with 95% Coverage	9.8
95% UPL	9.67	90% Percentile	8.27
90% Chebyshev UPL	11.29	95% Percentile	9.325
95% Chebyshev UPL	14.79	99% Percentile	9.738
95% USL	9.8		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|copper|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	21
Minimum	5.4	First Quartile	16.75
Second Largest	72	Median	29
Maximum	76	Third Quartile	38
Mean	30.27	SD	18.24
Coefficient of Variation	0.603	Skewness	1.069
Mean of logged Data	3.231	SD of logged Data	0.628

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	70.15	90% Percentile (z)	53.64
95% UPL (t)	61.67	95% Percentile (z)	60.27
95% USL	80.85	99% Percentile (z)	72.7

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Gamma GOF Test

A-D Test Statistic	0.379	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.102	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.951	k star (bias corrected MLE)	2.695
Theta hat (MLE)	10.26	Theta star (bias corrected MLE)	11.23
nu hat (MLE)	188.9	nu star (bias corrected)	172.5
MLE Mean (bias corrected)	30.27	MLE Sd (bias corrected)	18.44

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	66.66	90% Percentile	54.98
95% Hawkins Wixley (HW) Approx. Gamma UPL	68.08	95% Percentile	65.53
95% WH Approx. Gamma UTL with 95% Coverage	81.74	99% Percentile	88.54
95% HW Approx. Gamma UTL with 95% Coverage	84.86		
95% WH USL	103.8	95% HW USL	110.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	100	90% Percentile (z)	56.63
95% UPL (t)	74.69	95% Percentile (z)	71.16
95% USL	144.6	99% Percentile (z)	109.2

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	76
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	76	95% BCA Bootstrap UTL with 95% Coverage	76
95% UPL	73.4	90% Percentile	61.8
90% Chebyshev UPL	85.84	95% Percentile	68.15
95% Chebyshev UPL	111	99% Percentile	74.76
95% USL	76		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|iron (fe)|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	25
Minimum	1900	First Quartile	5600
Second Largest	36000	Median	12500
Maximum	38000	Third Quartile	16250
Mean	12953	SD	9257
Coefficient of Variation	0.715	Skewness	1.336
Mean of logged Data	9.23	SD of logged Data	0.722

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.174	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	33191	90% Percentile (z)	24816
95% UPL (t)	28892	95% Percentile (z)	28179
95% USL	38625	99% Percentile (z)	34488

Gamma GOF Test

A-D Test Statistic	0.496	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.105	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.24	k star (bias corrected MLE)	2.051
Theta hat (MLE)	5782	Theta star (bias corrected MLE)	6315
nu hat (MLE)	143.4	nu star (bias corrected)	131.3
MLE Mean (bias corrected)	12953	MLE Sd (bias corrected)	9045

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	31038	90% Percentile	25043
95% Hawkins Wixley (HW) Approx. Gamma UPL	31755	95% Percentile	30481
95% WH Approx. Gamma UTL with 95% Coverage	38926	99% Percentile	42522
95% HW Approx. Gamma UTL with 95% Coverage	40623		
95% WH USL	50675	95% HW USL	54347

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	49405	90% Percentile (z)	25712
95% UPL (t)	35331	95% Percentile (z)	33422
95% USL	75478	99% Percentile (z)	54662

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	38000
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	38000	95% BCA Bootstrap UTL with 95% Coverage	38000
95% UPL	36700	90% Percentile	28000
90% Chebyshev UPL	41154	95% Percentile	32700
95% Chebyshev UPL	53928	99% Percentile	37380
95% USL	38000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|lead|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
Minimum	0.61	First Quartile	1.738
Second Largest	5.4	Median	2.6
Maximum	5.8	Third Quartile	3.525
Mean	2.771	SD	1.42
Coefficient of Variation	0.512	Skewness	0.623
Mean of logged Data	0.879	SD of logged Data	0.564

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.0967	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	5.876	90% Percentile (z)	4.591
95% UPL (t)	5.217	95% Percentile (z)	5.107
95% USL	6.71	99% Percentile (z)	6.075

Gamma GOF Test

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

A-D Test Statistic	0.21	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0724	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.156	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.72	k star (bias corrected MLE)	3.393
Theta hat (MLE)	0.745	Theta star (bias corrected MLE)	0.817
nu hat (MLE)	238.1	nu star (bias corrected)	217.1
MLE Mean (bias corrected)	2.771	MLE Sd (bias corrected)	1.505

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	5.71	90% Percentile	4.789
95% Hawkins Wixley (HW) Approx. Gamma UPL	5.83	95% Percentile	5.617
95% WH Approx. Gamma UTL with 95% Coverage	6.879	99% Percentile	7.402
95% HW Approx. Gamma UTL with 95% Coverage	7.126		
95% WH USL	8.572	95% HW USL	9.059

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.108	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	8.257	90% Percentile (z)	4.959
95% UPL (t)	6.355	95% Percentile (z)	6.085
95% USL	11.49	99% Percentile (z)	8.935

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	5.8
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	5.8	95% BCA Bootstrap UTL with 95% Coverage	5.58
95% UPL	5.54	90% Percentile	5.26
90% Chebyshev UPL	7.098	95% Percentile	5.345
95% Chebyshev UPL	9.058	99% Percentile	5.676
95% USL	5.8		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|magnesium (mg)|)

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	28
Minimum	320	First Quartile	865
Second Largest	8400	Median	1600
Maximum	8800	Third Quartile	2850
Mean	2416	SD	2220
Coefficient of Variation	0.919	Skewness	1.754
Mean of logged Data	7.446	SD of logged Data	0.836

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.774	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	7270	90% Percentile (z)	5261
95% UPL (t)	6239	95% Percentile (z)	6068
95% USL	8573	99% Percentile (z)	7581

Gamma GOF Test

A-D Test Statistic	0.773	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.131	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.158	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.598	k star (bias corrected MLE)	1.469
Theta hat (MLE)	1512	Theta star (bias corrected MLE)	1645
nu hat (MLE)	102.3	nu star (bias corrected)	94.03
MLE Mean (bias corrected)	2416	MLE Sd (bias corrected)	1993

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	6430	90% Percentile	5061
95% Hawkins Wixley (HW) Approx. Gamma UPL	6550	95% Percentile	6338
95% WH Approx. Gamma UTL with 95% Coverage	8315	99% Percentile	9227
95% HW Approx. Gamma UTL with 95% Coverage	8672		
95% WH USL	11182	95% HW USL	12047

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	10642	90% Percentile (z)	4997
95% UPL (t)	7219	95% Percentile (z)	6769
95% USL	17381	99% Percentile (z)	11963

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	8800
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	8800	95% BCA Bootstrap UTL with 95% Coverage	8800
95% UPL	8540	90% Percentile	5340
90% Chebyshev UPL	9180	95% Percentile	7740
95% Chebyshev UPL	12243	99% Percentile	8676
95% USL	8800		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|manganese (mn)|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
Minimum	25	First Quartile	76
Second Largest	530	Median	150
Maximum	760	Third Quartile	280
Mean	198.8	SD	166.7
Coefficient of Variation	0.838	Skewness	1.649
Mean of logged Data	4.985	SD of logged Data	0.808

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.832	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.225	Lilliefors GOF Test
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	563.2	90% Percentile (z)	412.4
95% UPL (t)	485.8	95% Percentile (z)	473
95% USL	661	99% Percentile (z)	586.5

Gamma GOF Test

A-D Test Statistic	0.447	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.158	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.772	k star (bias corrected MLE)	1.627
Theta hat (MLE)	112.2	Theta star (bias corrected MLE)	122.3
nu hat (MLE)	113.4	nu star (bias corrected)	104.1
MLE Mean (bias corrected)	198.8	MLE Sd (bias corrected)	155.9

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	512.9	90% Percentile	406.3
95% Hawkins Wixley (HW) Approx. Gamma UPL	524.5	95% Percentile	504.2
95% WH Approx. Gamma UTL with 95% Coverage	656.8	99% Percentile	724.2
95% HW Approx. Gamma UTL with 95% Coverage	687.2		
95% WH USL	874.2	95% HW USL	943.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.082	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	854.2	90% Percentile (z)	411.4
95% UPL (t)	587	95% Percentile (z)	551.6
95% USL	1372	99% Percentile (z)	956.5

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	760
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	760	95% BCA Bootstrap UTL with 95% Coverage	760
95% UPL	610.5	90% Percentile	417
90% Chebyshev UPL	706.6	95% Percentile	480.5
95% Chebyshev UPL	936.5	99% Percentile	688.7
95% USL	760		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|nickel|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Minimum	1.6	First Quartile	4
Second Largest	23	Median	6.475
Maximum	25	Third Quartile	10.25
Mean	8.175	SD	5.995
Coefficient of Variation	0.733	Skewness	1.509
Mean of logged Data	1.872	SD of logged Data	0.686

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.832	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	21.28	90% Percentile (z)	15.86
95% UPL (t)	18.5	95% Percentile (z)	18.04
95% USL	24.8	99% Percentile (z)	22.12

Gamma GOF Test

A-D Test Statistic	0.453	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.104	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.332	k star (bias corrected MLE)	2.134
Theta hat (MLE)	3.506	Theta star (bias corrected MLE)	3.831
nu hat (MLE)	149.2	nu star (bias corrected)	136.6
MLE Mean (bias corrected)	8.175	MLE Sd (bias corrected)	5.596

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	19.31	90% Percentile	15.66
95% Hawkins Wixley (HW) Approx. Gamma UPL	19.62	95% Percentile	19
95% WH Approx. Gamma UTL with 95% Coverage	24.14	99% Percentile	26.38
95% HW Approx. Gamma UTL with 95% Coverage	24.97		
95% WH USL	31.31	95% HW USL	33.22

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0769	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	29.11	90% Percentile (z)	15.65
95% UPL (t)	21.17	95% Percentile (z)	20.08

95% USL	43.55	99% Percentile (z)	32.05

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	25
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	25	95% BCA Bootstrap UTL with 95% Coverage	25
95% UPL	23.7	90% Percentile	16.5
90% Chebyshev UPL	26.44	95% Percentile	21.9
95% Chebyshev UPL	34.71	99% Percentile	24.38
95% USL	25		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|potassium (k)|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	28
Minimum	210	First Quartile	430
Second Largest	5700	Median	887.5
Maximum	6100	Third Quartile	1725
Mean	1507	SD	1560
Coefficient of Variation	1.035	Skewness	1.782
Mean of logged Data	6.885	SD of logged Data	0.928

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4916	90% Percentile (z)	3505
95% UPL (t)	4192	95% Percentile (z)	4072
95% USL	5832	99% Percentile (z)	5135

Gamma GOF Test

A-D Test Statistic	0.927	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.769	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.136	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.159	Detected data appear Gamma Distributed at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.297	k star (bias corrected MLE)	1.196
Theta hat (MLE)	1161	Theta star (bias corrected MLE)	1259
nu hat (MLE)	83.03	nu star (bias corrected)	76.58
MLE Mean (bias corrected)	1507	MLE Sd (bias corrected)	1377

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4288	90% Percentile	3319
95% Hawkins Wixley (HW) Approx. Gamma UPL	4367	95% Percentile	4239
95% WH Approx. Gamma UTL with 95% Coverage	5660	99% Percentile	6348
95% HW Approx. Gamma UTL with 95% Coverage	5924		
95% WH USL	7776	95% HW USL	8447

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0946	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	7431	90% Percentile (z)	3210
95% UPL (t)	4830	95% Percentile (z)	4497
95% USL	12812	99% Percentile (z)	8463

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	6100
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	6100	95% BCA Bootstrap UTL with 95% Coverage	6100
95% UPL	5840	90% Percentile	3730
90% Chebyshev UPL	6258	95% Percentile	5040
95% Chebyshev UPL	8410	99% Percentile	5976
95% USL	6100		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|sodium (na)|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
Minimum	41	First Quartile	65.75
Second Largest	210	Median	81.5

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Maximum	320	Third Quartile	90.25
Mean	93.7	SD	58.03
Coefficient of Variation	0.619	Skewness	2.508
Mean of logged Data	4.418	SD of logged Data	0.461

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.697	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	220.6	90% Percentile (z)	168.1
95% UPL (t)	193.6	95% Percentile (z)	189.2
95% USL	254.7	99% Percentile (z)	228.7

Gamma GOF Test

A-D Test Statistic	1.966	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.263	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.156	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.25	k star (bias corrected MLE)	3.873
Theta hat (MLE)	22.05	Theta star (bias corrected MLE)	24.2
nu hat (MLE)	272	nu star (bias corrected)	247.9
MLE Mean (bias corrected)	93.7	MLE Sd (bias corrected)	47.61

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	184.6	90% Percentile	157.5
95% Hawkins Wixley (HW) Approx. Gamma UPL	184	95% Percentile	183.2
95% WH Approx. Gamma UTL with 95% Coverage	220.3	99% Percentile	238.1
95% HW Approx. Gamma UTL with 95% Coverage	221.4		
95% WH USL	271.6	95% HW USL	276.4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	227	90% Percentile (z)	149.7
95% UPL (t)	183.3	95% Percentile (z)	176.9
95% USL	297.6	99% Percentile (z)	242.2

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	320
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	320	95% BCA Bootstrap UTL with 95% Coverage	320
95% UPL	248.5	90% Percentile	168
90% Chebyshev UPL	270.5	95% Percentile	204.5
95% Chebyshev UPL	350.6	99% Percentile	285.9
95% USL	320		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|thallium|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	29		
Number of Detects	30	Number of Non-Detects	2
Number of Distinct Detects	27	Number of Distinct Non-Detects	2
Minimum Detect	0.042	Minimum Non-Detect	0.034
Maximum Detect	0.45	Maximum Non-Detect	0.038
Variance Detected	0.0125	Percent Non-Detects	6.25%
Mean Detected	0.142	SD Detected	0.112
Mean of Detected Logged Data	-2.193	SD of Detected Logged Data	0.68

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.781	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.135	KM SD	0.109
95% UTL95% Coverage	0.374	95% KM UPL (t)	0.323
90% KM Percentile (z)	0.275	95% KM Percentile (z)	0.315
99% KM Percentile (z)	0.39	95% KM USL	0.439

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.134	SD	0.112
95% UTL95% Coverage	0.379	95% UPL (t)	0.327
90% Percentile (z)	0.278	95% Percentile (z)	0.319

99% Percentile (z)	0.395	95% USL	0.445

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.842	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.162	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.236	k star (bias corrected MLE)	2.035
Theta hat (MLE)	0.0634	Theta star (bias corrected MLE)	0.0697
nu hat (MLE)	134.2	nu star (bias corrected)	122.1
MLE Mean (bias corrected)	0.142		
MLE Sd (bias corrected)	0.0994	95% Percentile of Chisquare (2kstar)	9.6

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.134
Maximum	0.45	Median	0.096
SD	0.113	CV	0.844
k hat (MLE)	1.658	k star (bias corrected MLE)	1.524
Theta hat (MLE)	0.0806	Theta star (bias corrected MLE)	0.0877
nu hat (MLE)	106.1	nu star (bias corrected)	97.51
MLE Mean (bias corrected)	0.134	MLE Sd (bias corrected)	0.108
95% Percentile of Chisquare (2kstar)	7.896	90% Percentile	0.277
95% Percentile	0.346	99% Percentile	0.502

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.452	0.48	95% Approx. Gamma UPL	0.352	0.364
95% Gamma USL	0.605	0.665			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.135	SD (KM)	0.109
Variance (KM)	0.012	SE of Mean (KM)	0.0197
k hat (KM)	1.525	k star (KM)	1.403
nu hat (KM)	97.61	nu star (KM)	89.79
theta hat (KM)	0.0886	theta star (KM)	0.0963
80% gamma percentile (KM)	0.211	90% gamma percentile (KM)	0.286
95% gamma percentile (KM)	0.36	99% gamma percentile (KM)	0.527

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.414	0.426	95% Approx. Gamma UPL	0.328	0.331
95% KM Gamma Percentile	0.315	0.317	95% Gamma USL	0.542	0.573

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.927	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0876	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.159	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.134	Mean in Log Scale	-2.294
SD in Original Scale	0.112	SD in Log Scale	0.767
95% UTL95% Coverage	0.54	95% BCA UTL95% Coverage	0.45
95% Bootstrap (%) UTL95% Coverage	0.45	95% UPL (t)	0.378
90% Percentile (z)	0.27	95% Percentile (z)	0.356
99% Percentile (z)	0.601	95% USL	0.847

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.267	95% KM UTL (Lognormal)95% Coverage	0.487
KM SD of Logged Data	0.708	95% KM UPL (Lognormal)	0.351
95% KM Percentile Lognormal (z)	0.332	95% KM USL (Lognormal)	0.738

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.134	Mean in Log Scale	-2.307
SD in Original Scale	0.112	SD in Log Scale	0.796
95% UTL95% Coverage	0.568	95% UPL (t)	0.392
90% Percentile (z)	0.276	95% Percentile (z)	0.369
99% Percentile (z)	0.635	95% USL	0.906

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	0.45
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.437
95% USL	0.45	95% KM Chebyshev UPL	0.619

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|vanadium|)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
Minimum	4.1	First Quartile	12.5
Second Largest	59	Median	18.5
Maximum	60	Third Quartile	24.25
Mean	21.47	SD	15.04

Coefficient of Variation	0.701	Skewness	1.577
Mean of logged Data	2.86	SD of logged Data	0.654

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test

Shapiro Wilk Test Statistic	0.798	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	54.36	90% Percentile (z)	40.75
95% UPL (t)	47.37	95% Percentile (z)	46.21
95% USL	63.19	99% Percentile (z)	56.46

Gamma GOF Test

A-D Test Statistic	0.674	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.136	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.157	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.574	k star (bias corrected MLE)	2.354
Theta hat (MLE)	8.34	Theta star (bias corrected MLE)	9.121
nu hat (MLE)	164.7	nu star (bias corrected)	150.6
MLE Mean (bias corrected)	21.47	MLE Sd (bias corrected)	13.99

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	49.14	90% Percentile	40.2
95% Hawkins Wixley (HW) Approx. Gamma UPL	49.9	95% Percentile	48.41
95% WH Approx. Gamma UTL with 95% Coverage	60.91	99% Percentile	66.43
95% HW Approx. Gamma UTL with 95% Coverage	62.9		
95% WH USL	78.31	95% HW USL	82.78

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.11	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	72.91	90% Percentile (z)	40.36
95% UPL (t)	53.82	95% Percentile (z)	51.18
95% USL	107	99% Percentile (z)	79.9

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	32	95% UTL with 95% Coverage	60
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	60	95% BCA Bootstrap UTL with 95% Coverage	60
95% UPL	59.35	90% Percentile	49.6
90% Chebyshev UPL	67.3	95% Percentile	57.35
95% Chebyshev UPL	88.06	99% Percentile	59.69
95% USL	60		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|sb|metals|zinc|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	27		
Number of Detects	31	Number of Non-Detects	1
Number of Distinct Detects	26	Number of Distinct Non-Detects	1
Minimum Detect	3	Minimum Non-Detect	0.27
Maximum Detect	50	Maximum Non-Detect	0.27
Variance Detected	143.3	Percent Non-Detects	3.125%
Mean Detected	17.33	SD Detected	11.97
Mean of Detected Logged Data	2.633	SD of Detected Logged Data	0.684

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	16.79	KM SD	11.97
95% UTL95% Coverage	42.95	95% KM UPL (t)	37.39
90% KM Percentile (z)	32.13	95% KM Percentile (z)	36.47
99% KM Percentile (z)	44.63	95% KM USL	49.98

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	16.79	SD	12.16
95% UTL95% Coverage	43.38	95% UPL (t)	37.73
90% Percentile (z)	32.38	95% Percentile (z)	36.79
99% Percentile (z)	45.08	95% USL	50.52

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.348	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0971	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.159	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.436	k star (bias corrected MLE)	2.221
Theta hat (MLE)	7.114	Theta star (bias corrected MLE)	7.8
nu hat (MLE)	151	nu star (bias corrected)	137.7
MLE Mean (bias corrected)	17.33		
MLE Sd (bias corrected)	11.62	95% Percentile of Chisquare (2kstar)	10.2

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	16.78
Maximum	50	Median	14.5
SD	12.17	CV	0.725
k hat (MLE)	1.351	k star (bias corrected MLE)	1.245
Theta hat (MLE)	12.42	Theta star (bias corrected MLE)	13.48
nu hat (MLE)	86.48	nu star (bias corrected)	79.71
MLE Mean (bias corrected)	16.78	MLE Sd (bias corrected)	15.04
95% Percentile of Chisquare (2kstar)	6.912	90% Percentile	36.61
95% Percentile	46.57	99% Percentile	69.35

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	58.58	67.53	95% Approx. Gamma UPL	45.41	50.28
95% Gamma USL	78.59	95.27			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	16.79	SD (KM)	11.97
Variance (KM)	143.2	SE of Mean (KM)	2.15
k hat (KM)	1.97	k star (KM)	1.806
nu hat (KM)	126.1	nu star (KM)	115.6
theta hat (KM)	8.525	theta star (KM)	9.299
80% gamma percentile (KM)	25.44	90% gamma percentile (KM)	33.46
95% gamma percentile (KM)	41.15	99% gamma percentile (KM)	58.32

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	54.2	58.89	95% Approx. Gamma UPL	42.59	44.97
95% KM Gamma Percentile	40.85	42.93	95% Gamma USL	71.66	80.83

Lognormal GOF Test on Detected Observations Only

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.929	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0969	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.156	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	16.86	Mean in Log Scale	2.579
SD in Original Scale	12.07	SD in Log Scale	0.739
95% UTL95% Coverage	66.36	95% BCA UTL95% Coverage	50
95% Bootstrap (%) UTL95% Coverage	50	95% UPL (t)	47.08
90% Percentile (z)	34	95% Percentile (z)	44.47
99% Percentile (z)	73.6	95% USL	102.4

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	2.51	95% KM UTL (Lognormal)95% Coverage	98.93
KM SD of Logged Data	0.953	95% KM UPL (Lognormal)	63.54
95% KM Percentile Lognormal (z)	59.04	95% KM USL (Lognormal)	173.2

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	16.79	Mean in Log Scale	2.488
SD in Original Scale	12.16	SD in Log Scale	1.06
95% UTL95% Coverage	122.3	95% UPL (t)	74.73
90% Percentile (z)	46.86	95% Percentile (z)	68.87
99% Percentile (z)	141.9	95% USL	227.9

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	50
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	46.75
95% USL	50	95% KM Chebyshev UPL	69.76

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|aluminum|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	23
Minimum	5200	First Quartile	8650
Second Largest	21000	Median	10950
Maximum	22000	Third Quartile	16000
Mean	12438	SD	4991
Coefficient of Variation	0.401	Skewness	0.381
Mean of logged Data	9.346	SD of logged Data	0.421

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	23519	90% Percentile (z)	18835
95% UPL (t)	21059	95% Percentile (z)	20648
95% USL	26140	99% Percentile (z)	24050

Gamma GOF Test

A-D Test Statistic	0.545	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.244	k star (bias corrected MLE)	5.642
Theta hat (MLE)	1992	Theta star (bias corrected MLE)	2205
nu hat (MLE)	374.6	nu star (bias corrected)	338.5
MLE Mean (bias corrected)	12438	MLE Sd (bias corrected)	5237

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	22406	90% Percentile	19443
95% Hawkins Wixley (HW) Approx. Gamma UPL	22672	95% Percentile	22113
95% WH Approx. Gamma UTL with 95% Coverage	26311	99% Percentile	27724
95% HW Approx. Gamma UTL with 95% Coverage	26880		
95% WH USL	30944	95% HW USL	31982

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.15	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	29151	90% Percentile (z)	19642
95% UPL (t)	23693	95% Percentile (z)	22886
95% USL	36357	99% Percentile (z)	30484

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Order of Statistic, r	30	95% UTL with 95% Coverage	22000
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	22000	95% BCA Bootstrap UTL with 95% Coverage	21550
95% UPL	21450	90% Percentile	19200
90% Chebyshev UPL	27660	95% Percentile	21000
95% Chebyshev UPL	34555	99% Percentile	21710
95% USL	22000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|antimony|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	21
Minimum	0.45	First Quartile	1.225
Second Largest	5.3	Median	1.75
Maximum	5.3	Third Quartile	2.65
Mean	2.111	SD	1.274
Coefficient of Variation	0.604	Skewness	1.268
Mean of logged Data	0.583	SD of logged Data	0.588

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4.94	90% Percentile (z)	3.744
95% UPL (t)	4.312	95% Percentile (z)	4.207
95% USL	5.609	99% Percentile (z)	5.075

Gamma GOF Test

A-D Test Statistic	0.394	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.102	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.161	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.207	k star (bias corrected MLE)	2.909
Theta hat (MLE)	0.658	Theta star (bias corrected MLE)	0.726
nu hat (MLE)	192.4	nu star (bias corrected)	174.5

MLE Mean (bias corrected)	2.111	MLE Sd (bias corrected)	1.238

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4.544	90% Percentile	3.77
95% Hawkins Wixley (HW) Approx. Gamma UPL	4.614	95% Percentile	4.469
95% WH Approx. Gamma UTL with 95% Coverage	5.6	99% Percentile	5.987
95% HW Approx. Gamma UTL with 95% Coverage	5.776		
95% WH USL	6.895	95% HW USL	7.241

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.978	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.103	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6.602	90% Percentile (z)	3.804
95% UPL (t)	4.943	95% Percentile (z)	4.709
95% USL	8.989	99% Percentile (z)	7.028

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	5.3
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	5.3	95% BCA Bootstrap UTL with 95% Coverage	5.3
95% UPL	5.3	90% Percentile	3.53
90% Chebyshev UPL	5.997	95% Percentile	5.03
95% Chebyshev UPL	7.757	99% Percentile	5.3
95% USL	5.3		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|arsenic|ml|)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	14
Minimum	0.99	First Quartile	1.8
Second Largest	4.3	Median	2.8
Maximum	4.6	Third Quartile	3.35
Mean	2.612	SD	1.138
Coefficient of Variation	0.436	Skewness	0.0636
Mean of logged Data	0.853	SD of logged Data	0.507

Critical Values for Background Threshold Values (BTVs)

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Tolerance Factor K (For UTL)	2.566	d2max (for USL)	2.409

Normal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.108	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	5.533	90% Percentile (z)	4.071
95% UPL (t)	4.683	95% Percentile (z)	4.484
95% USL	5.354	99% Percentile (z)	5.26

Gamma GOF Test

A-D Test Statistic	0.403	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.821	k star (bias corrected MLE)	3.901
Theta hat (MLE)	0.542	Theta star (bias corrected MLE)	0.67
nu hat (MLE)	144.6	nu star (bias corrected)	117
MLE Mean (bias corrected)	2.612	MLE Sd (bias corrected)	1.322

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	5.267	90% Percentile	4.385
95% Hawkins Wixley (HW) Approx. Gamma UPL	5.392	95% Percentile	5.097
95% WH Approx. Gamma UTL with 95% Coverage	6.877	99% Percentile	6.62
95% HW Approx. Gamma UTL with 95% Coverage	7.193		
95% WH USL	6.515	95% HW USL	6.782

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	8.625	90% Percentile (z)	4.495
95% UPL (t)	5.905	95% Percentile (z)	5.405
95% USL	7.965	99% Percentile (z)	7.638

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	15	95% UTL with 95% Coverage	4.6
Approx, f used to compute achieved CC	0.789	Approximate Actual Confidence Coefficient achieved by UTL	0.537

		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	4.6	95% BCA Bootstrap UTL with 95% Coverage	4.6
95% UPL	4.6	90% Percentile	3.98
90% Chebyshev UPL	6.139	95% Percentile	4.39
95% Chebyshev UPL	7.737	99% Percentile	4.558
95% USL	4.6		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|arsenic|wsl|)

General Statistics

Total Number of Observations	15	Number of Missing Observations	0
Number of Distinct Observations	13		
Number of Detects	14	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.88	Minimum Non-Detect	0.56
Maximum Detect	3	Maximum Non-Detect	0.56
Variance Detected	0.562	Percent Non-Detects	6.667%
Mean Detected	1.845	SD Detected	0.749
Mean of Detected Logged Data	0.53	SD of Detected Logged Data	0.432

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.566	d2max (for USL)	2.409

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.759	KM SD	0.768
95% UTL95% Coverage	3.729	95% KM UPL (t)	3.156
90% KM Percentile (z)	2.743	95% KM Percentile (z)	3.022
99% KM Percentile (z)	3.545	95% KM USL	3.609

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	1.741	SD	0.827
95% UTL95% Coverage	3.864	95% UPL (t)	3.246
90% Percentile (z)	2.801	95% Percentile (z)	3.102
99% Percentile (z)	3.666	95% USL	3.734

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.456	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.187	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.229	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	6.188	k star (bias corrected MLE)	4.909
Theta hat (MLE)	0.298	Theta star (bias corrected MLE)	0.376
nu hat (MLE)	173.3	nu star (bias corrected)	137.5
MLE Mean (bias corrected)	1.845		
MLE Sd (bias corrected)	0.833	95% Percentile of Chisquare (2kstar)	18.06

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.438	Mean	1.751
Maximum	3	Median	1.6
SD	0.808	CV	0.462
k hat (MLE)	4.289	k star (bias corrected MLE)	3.475
Theta hat (MLE)	0.408	Theta star (bias corrected MLE)	0.504
nu hat (MLE)	128.7	nu star (bias corrected)	104.3
MLE Mean (bias corrected)	1.751	MLE Sd (bias corrected)	0.939
95% Percentile of Chisquare (2kstar)	14	90% Percentile	3.011
95% Percentile	3.526	99% Percentile	4.634

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	4.826	5.073	95% Approx. Gamma UPL	3.652	3.749
95% Gamma USL	4.561	4.769			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.759	SD (KM)	0.768
Variance (KM)	0.589	SE of Mean (KM)	0.206
k hat (KM)	5.251	k star (KM)	4.245
nu hat (KM)	157.5	nu star (KM)	127.4
theta hat (KM)	0.335	theta star (KM)	0.414
80% gamma percentile (KM)	2.409	90% gamma percentile (KM)	2.904
95% gamma percentile (KM)	3.357	99% gamma percentile (KM)	4.324

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	4.527	4.709	95% Approx. Gamma UPL	3.484	3.553
95% KM Gamma Percentile	3.266	3.317	95% Gamma USL	4.293	4.445

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	1.762	Mean in Log Scale	0.46
SD in Original Scale	0.791	SD in Log Scale	0.496
95% UTL95% Coverage	5.658	95% BCA UTL95% Coverage	3
95% Bootstrap (%) UTL95% Coverage	3	95% UPL (t)	3.906
90% Percentile (z)	2.991	95% Percentile (z)	3.582
99% Percentile (z)	5.024	95% USL	5.234

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.456	95% KM UTL (Lognormal)95% Coverage	5.516
KM SD of Logged Data	0.488	95% KM UPL (Lognormal)	3.831
95% KM Percentile Lognormal (z)	3.519	95% KM USL (Lognormal)	5.109

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	1.741	Mean in Log Scale	0.409
SD in Original Scale	0.827	SD in Log Scale	0.624
95% UTL95% Coverage	7.472	95% UPL (t)	4.687
90% Percentile (z)	3.351	95% Percentile (z)	4.204
99% Percentile (z)	6.434	95% USL	6.774

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	15	95% UTL with95% Coverage	3
Approx, f used to compute achieved CC	0.789	Approximate Actual Confidence Coefficient achieved by UTL	0.537
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3
95% USL	3	95% KM Chebyshev UPL	5.216

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|barium|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	18
Minimum	8.8	First Quartile	14.25
Second Largest	38	Median	18
Maximum	38	Third Quartile	32
Mean	22.48	SD	9.727
Coefficient of Variation	0.433	Skewness	0.295
Mean of logged Data	3.016	SD of logged Data	0.457

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Normal GOF Test

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	44.07	90% Percentile (z)	34.95
95% UPL (t)	39.28	95% Percentile (z)	38.48
95% USL	49.18	99% Percentile (z)	45.11

Gamma GOF Test

A-D Test Statistic	1.056	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.318	k star (bias corrected MLE)	4.809
Theta hat (MLE)	4.227	Theta star (bias corrected MLE)	4.675
nu hat (MLE)	319.1	nu star (bias corrected)	288.5
MLE Mean (bias corrected)	22.48	MLE Sd (bias corrected)	10.25

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	42.18	90% Percentile	36.21
95% Hawkins Wixley (HW) Approx. Gamma UPL	42.75	95% Percentile	41.56
95% WH Approx. Gamma UTL with 95% Coverage	50.07	99% Percentile	52.88
95% HW Approx. Gamma UTL with 95% Coverage	51.3		
95% WH USL	59.5	95% HW USL	61.77

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	56.3	90% Percentile (z)	36.66
95% UPL (t)	44.95	95% Percentile (z)	43.28
95% USL	71.58	99% Percentile (z)	59.11

Nonparametric Distribution Free Background Statistics

Data appear Approximate Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	38
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	38	95% BCA Bootstrap UTL with 95% Coverage	38

95% UPL	38	90% Percentile	35.2
90% Chebyshev UPL	52.14	95% Percentile	37.55
95% Chebyshev UPL	65.58	99% Percentile	38
95% USL	38		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|beryllium|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	25		
Number of Detects	28	Number of Non-Detects	2
Number of Distinct Detects	23	Number of Distinct Non-Detects	2
Minimum Detect	0.034	Minimum Non-Detect	0.0098
Maximum Detect	4.9	Maximum Non-Detect	0.011
Variance Detected	0.815	Percent Non-Detects	6.667%
Mean Detected	0.309	SD Detected	0.903
Mean of Detected Logged Data	-2.028	SD of Detected Logged Data	0.963

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.262	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.468	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.289	KM SD	0.86
95% UTL95% Coverage	2.198	95% KM UPL (t)	1.774
90% KM Percentile (z)	1.391	95% KM Percentile (z)	1.703
99% KM Percentile (z)	2.289	95% KM USL	2.65

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.289	SD	0.875
95% UTL95% Coverage	2.231	95% UPL (t)	1.8
90% Percentile (z)	1.41	95% Percentile (z)	1.727
99% Percentile (z)	2.324	95% USL	2.69

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.741	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.789	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.336	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.172	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.708	k star (bias corrected MLE)	0.656
Theta hat (MLE)	0.437	Theta star (bias corrected MLE)	0.471
nu hat (MLE)	39.62	nu star (bias corrected)	36.71
MLE Mean (bias corrected)	0.309		
MLE Sd (bias corrected)	0.381	95% Percentile of Chisquare (2kstar)	4.569

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.289
Maximum	4.9	Median	0.11
SD	0.875	CV	3.027
k hat (MLE)	0.639	k star (bias corrected MLE)	0.597
Theta hat (MLE)	0.452	Theta star (bias corrected MLE)	0.484
nu hat (MLE)	38.34	nu star (bias corrected)	35.84
MLE Mean (bias corrected)	0.289	MLE Sd (bias corrected)	0.374
95% Percentile of Chisquare (2kstar)	4.306	90% Percentile	0.752
95% Percentile	1.041	99% Percentile	1.741

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.27	1.216	95% Approx. Gamma UPL	0.879	0.817
95% Gamma USL	1.8	1.787			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.289	SD (KM)	0.86
Variance (KM)	0.739	SE of Mean (KM)	0.16
k hat (KM)	0.113	k star (KM)	0.124
nu hat (KM)	6.774	nu star (KM)	7.43
theta hat (KM)	2.559	theta star (KM)	2.333
80% gamma percentile (KM)	0.262	90% gamma percentile (KM)	0.825
95% gamma percentile (KM)	1.642	99% gamma percentile (KM)	4.115

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.238	1.183	95% Approx. Gamma UPL	0.859	0.797
95% KM Gamma Percentile	0.804	0.743	95% Gamma USL	1.75	1.732

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.289	Mean in Log Scale	-2.166
SD in Original Scale	0.874	SD in Log Scale	1.068
95% UTL95% Coverage	1.227	95% BCA UTL95% Coverage	2.83
95% Bootstrap (%) UTL95% Coverage	4.9	95% UPL (t)	0.725
90% Percentile (z)	0.45	95% Percentile (z)	0.664
99% Percentile (z)	1.375	95% USL	2.15

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.201	95% KM UTL (Lognormal)95% Coverage	1.33
KM SD of Logged Data	1.12	95% KM UPL (Lognormal)	0.766
95% KM Percentile Lognormal (z)	0.698	95% KM USL (Lognormal)	2.395

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.289	Mean in Log Scale	-2.243
SD in Original Scale	0.875	SD in Log Scale	1.239
95% UTL95% Coverage	1.662	95% UPL (t)	0.903
90% Percentile (z)	0.519	95% Percentile (z)	0.815
99% Percentile (z)	1.896	95% USL	3.187

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	4.9
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2.37
95% USL	4.9	95% KM Chebyshev UPL	4.099

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|calcium (ca)|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	24
Minimum	220	First Quartile	270
Second Largest	970	Median	345
Maximum	1700	Third Quartile	467.5
Mean	425.8	SD	286.5
Coefficient of Variation	0.673	Skewness	3.421
Mean of logged Data	5.931	SD of logged Data	0.451

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.62	**Shapiro Wilk GOF Test**	

5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1062	90% Percentile (z)	792.9
95% UPL (t)	920.6	95% Percentile (z)	897
95% USL	1212	99% Percentile (z)	1092

Gamma GOF Test

A-D Test Statistic	1.438	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.161	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.212	k star (bias corrected MLE)	3.813
Theta hat (MLE)	101.1	Theta star (bias corrected MLE)	111.7
nu hat (MLE)	252.7	nu star (bias corrected)	228.8
MLE Mean (bias corrected)	425.8	MLE Sd (bias corrected)	218.1

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	840.7	90% Percentile	718.2
95% Hawkins Wixley (HW) Approx. Gamma UPL	834.2	95% Percentile	836
95% WH Approx. Gamma UTL with 95% Coverage	1014	99% Percentile	1088
95% HW Approx. Gamma UTL with 95% Coverage	1014		
95% WH USL	1223	95% HW USL	1236

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	1025	90% Percentile (z)	671.3
95% UPL (t)	820.9	95% Percentile (z)	790.9
95% USL	1300	99% Percentile (z)	1076

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	1700
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1700	95% BCA Bootstrap UTL with 95% Coverage	1372
95% UPL	1299	90% Percentile	564
90% Chebyshev UPL	1299	95% Percentile	803.5

95% Chebyshev UPL	1695	99% Percentile	1488
95% USL	1700		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|chromium|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	22
Minimum	4.2	First Quartile	8
Second Largest	24	Median	11
Maximum	30	Third Quartile	16
Mean	12.85	SD	6.09
Coefficient of Variation	0.474	Skewness	1.036
Mean of logged Data	2.45	SD of logged Data	0.463

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	26.37	90% Percentile (z)	20.65
95% UPL (t)	23.37	95% Percentile (z)	22.86
95% USL	29.57	99% Percentile (z)	27.01

Gamma GOF Test

A-D Test Statistic	0.341	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.141	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.004	k star (bias corrected MLE)	4.526
Theta hat (MLE)	2.567	Theta star (bias corrected MLE)	2.839
nu hat (MLE)	300.2	nu star (bias corrected)	271.5
MLE Mean (bias corrected)	12.85	MLE Sd (bias corrected)	6.039

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	24.45	90% Percentile	20.94
95% Hawkins Wixley (HW) Approx. Gamma UPL	24.71	95% Percentile	24.12
95% WH Approx. Gamma UTL with 95% Coverage	29.14	99% Percentile	30.86

95% HW Approx. Gamma UTL with 95% Coverage	29.77		
95% WH USL	34.77	95% HW USL	35.98

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	32.4	90% Percentile (z)	20.98
95% UPL (t)	25.79	95% Percentile (z)	24.83
95% USL	41.33	99% Percentile (z)	34.04

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	30
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	30	95% BCA Bootstrap UTL with 95% Coverage	30
95% UPL	26.7	90% Percentile	21.2
90% Chebyshev UPL	31.42	95% Percentile	23.55
95% Chebyshev UPL	39.83	99% Percentile	28.26
95% USL	30		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|cobalt|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	25
Minimum	0.57	First Quartile	1.4
Second Largest	4.9	Median	1.85
Maximum	5.5	Third Quartile	2.675
Mean	2.171	SD	1.207
Coefficient of Variation	0.556	Skewness	1.179
Mean of logged Data	0.632	SD of logged Data	0.55

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.124	**Lilliefors GOF Test**

5% Lilliefors Critical Value	0.159	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4.85	90% Percentile (z)	3.717
95% UPL (t)	4.255	95% Percentile (z)	4.156
95% USL	5.483	99% Percentile (z)	4.978

Gamma GOF Test

A-D Test Statistic	0.188	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0867	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.161	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.664	k star (bias corrected MLE)	3.319
Theta hat (MLE)	0.592	Theta star (bias corrected MLE)	0.654
nu hat (MLE)	219.8	nu star (bias corrected)	199.2
MLE Mean (bias corrected)	2.171	MLE Sd (bias corrected)	1.191

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4.498	90% Percentile	3.768
95% Hawkins Wixley (HW) Approx. Gamma UPL	4.566	95% Percentile	4.427
95% WH Approx. Gamma UTL with 95% Coverage	5.486	99% Percentile	5.846
95% HW Approx. Gamma UTL with 95% Coverage	5.648		
95% WH USL	6.688	95% HW USL	7.001

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.062	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6.384	90% Percentile (z)	3.809
95% UPL (t)	4.868	95% Percentile (z)	4.652
95% USL	8.522	99% Percentile (z)	6.768

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	5.5
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	5.5	95% BCA Bootstrap UTL with 95% Coverage	5.5
95% UPL	5.17	90% Percentile	3.49
90% Chebyshev UPL	5.851	95% Percentile	4.63
95% Chebyshev UPL	7.518	99% Percentile	5.326
95% USL	5.5		

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|copper|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	22
Minimum	9	First Quartile	16.25
Second Largest	38	Median	24
Maximum	41	Third Quartile	32.75
Mean	24.52	SD	9.293
Coefficient of Variation	0.379	Skewness	-0.0153
Mean of logged Data	3.12	SD of logged Data	0.422

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.124	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	45.15	90% Percentile (z)	36.43
95% UPL (t)	40.57	95% Percentile (z)	39.8
95% USL	50.03	99% Percentile (z)	46.13

Gamma GOF Test

A-D Test Statistic	0.748	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.148	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.429	k star (bias corrected MLE)	5.808
Theta hat (MLE)	3.813	Theta star (bias corrected MLE)	4.221
nu hat (MLE)	385.7	nu star (bias corrected)	348.5
MLE Mean (bias corrected)	24.52	MLE Sd (bias corrected)	10.17

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	43.87	90% Percentile	38.12
95% Hawkins Wixley (HW) Approx. Gamma UPL	44.51	95% Percentile	43.29
95% WH Approx. Gamma UTL with 95% Coverage	51.42	99% Percentile	54.13
95% HW Approx. Gamma UTL with 95% Coverage	52.7		
95% WH USL	60.36	95% HW USL	62.61

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.927	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.155	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level	

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	57.81	90% Percentile (z)	38.89
95% UPL (t)	46.95	95% Percentile (z)	45.34
95% USL	72.16	99% Percentile (z)	60.47

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	41
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	41	95% BCA Bootstrap UTL with 95% Coverage	41
95% UPL	39.35	90% Percentile	35.2
90% Chebyshev UPL	52.86	95% Percentile	37.55
95% Chebyshev UPL	65.69	99% Percentile	40.13
95% USL	41		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|iron (fe)|ml|)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	11
Minimum	6000	First Quartile	9500
Second Largest	20000	Median	13000
Maximum	20000	Third Quartile	16500
Mean	13240	SD	4516
Coefficient of Variation	0.341	Skewness	9.6702E-4
Mean of logged Data	9.43	SD of logged Data	0.373

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.566	d2max (for USL)	2.409

Normal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	24828	90% Percentile (z)	19028
95% UPL (t)	21455	95% Percentile (z)	20668
95% USL	24120	99% Percentile (z)	23746

Gamma GOF Test

A-D Test Statistic	0.31	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.152	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.387	k star (bias corrected MLE)	6.754
Theta hat (MLE)	1579	Theta star (bias corrected MLE)	1960
nu hat (MLE)	251.6	nu star (bias corrected)	202.6
MLE Mean (bias corrected)	13240	MLE Sd (bias corrected)	5094

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	23094	90% Percentile	20043
95% Hawkins Wixley (HW) Approx. Gamma UPL	23402	95% Percentile	22578
95% WH Approx. Gamma UTL with 95% Coverage	28608	99% Percentile	27864
95% HW Approx. Gamma UTL with 95% Coverage	29374		
95% WH USL	27384	95% HW USL	28034

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	32448	90% Percentile (z)	20096
95% UPL (t)	24558	95% Percentile (z)	23012
95% USL	30603	99% Percentile (z)	29673

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	15	95% UTL with 95% Coverage	20000
Approx, f used to compute achieved CC	0.789	Approximate Actual Confidence Coefficient achieved by UTL	0.537
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	20000	95% BCA Bootstrap UTL with 95% Coverage	20000
95% UPL	20000	90% Percentile	19200
90% Chebyshev UPL	27233	95% Percentile	20000
95% Chebyshev UPL	33571	99% Percentile	20000
95% USL	20000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|iron (fe)|wsl|)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	11
Minimum	3600	First Quartile	5300
Second Largest	16000	Median	6700
Maximum	18000	Third Quartile	14000
Mean	9473	SD	5009
Coefficient of Variation	0.529	Skewness	0.456
Mean of logged Data	9.02	SD of logged Data	0.546

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.566	d2max (for USL)	2.409

Normal GOF Test

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	22327	90% Percentile (z)	15893
95% UPL (t)	18585	95% Percentile (z)	17713
95% USL	21540	99% Percentile (z)	21126

Gamma GOF Test

A-D Test Statistic	0.848	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.228	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.223	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.822	k star (bias corrected MLE)	3.102
Theta hat (MLE)	2478	Theta star (bias corrected MLE)	3054
nu hat (MLE)	114.7	nu star (bias corrected)	93.07
MLE Mean (bias corrected)	9473	MLE Sd (bias corrected)	5379

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	20446	90% Percentile	16685
95% Hawkins Wixley (HW) Approx. Gamma UPL	20822	95% Percentile	19691
95% WH Approx. Gamma UTL with 95% Coverage	27382	99% Percentile	26196
95% HW Approx. Gamma UTL with 95% Coverage	28522		
95% WH USL	25812	95% HW USL	26751

Lognormal GOF Test

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	33536	90% Percentile (z)	16635
95% UPL (t)	22307	95% Percentile (z)	20284
95% USL	30782	99% Percentile (z)	29424

Nonparametric Distribution Free Background Statistics

Data appear Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	15	95% UTL with 95% Coverage	18000
Approx, f used to compute achieved CC	0.789	Approximate Actual Confidence Coefficient achieved by UTL	0.537
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	18000	95% BCA Bootstrap UTL with 95% Coverage	18000
95% UPL	18000	90% Percentile	16000
90% Chebyshev UPL	24993	95% Percentile	16600
95% Chebyshev UPL	32023	99% Percentile	17720
95% USL	18000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|lead|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	28
Minimum	2.5	First Quartile	3.325
Second Largest	10	Median	4.45
Maximum	11	Third Quartile	6.075
Mean	5.048	SD	2.295
Coefficient of Variation	0.455	Skewness	1.177
Mean of logged Data	1.531	SD of logged Data	0.417

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.143	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.159	Data appear Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

95% UTL with 95% Coverage	10.14	90% Percentile (z)	7.99
95% UPL (t)	9.013	95% Percentile (z)	8.824
95% USL	11.35	99% Percentile (z)	10.39

Gamma GOF Test

A-D Test Statistic	0.582	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.122	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.826	k star (bias corrected MLE)	5.266
Theta hat (MLE)	0.867	Theta star (bias corrected MLE)	0.959
nu hat (MLE)	349.6	nu star (bias corrected)	315.9
MLE Mean (bias corrected)	5.048	MLE Sd (bias corrected)	2.2

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	9.236	90% Percentile	7.993
95% Hawkins Wixley (HW) Approx. Gamma UPL	9.29	95% Percentile	9.125
95% WH Approx. Gamma UTL with 95% Coverage	10.9	99% Percentile	11.51
95% HW Approx. Gamma UTL with 95% Coverage	11.05		
95% WH USL	12.87	95% HW USL	13.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.102	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	11.67	90% Percentile (z)	7.89
95% UPL (t)	9.503	95% Percentile (z)	9.182
95% USL	14.53	99% Percentile (z)	12.2

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	11
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	11	95% BCA Bootstrap UTL with 95% Coverage	11
95% UPL	10.45	90% Percentile	7.91
90% Chebyshev UPL	12.05	95% Percentile	9.91
95% Chebyshev UPL	15.22	99% Percentile	10.71
95% USL	11		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|magnesium (mg)|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	24
Minimum	290	First Quartile	607.5
Second Largest	2500	Median	900
Maximum	2900	Third Quartile	1500
Mean	1149	SD	695.2
Coefficient of Variation	0.605	Skewness	0.884
Mean of logged Data	6.863	SD of logged Data	0.633

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	2693	90% Percentile (z)	2040
95% UPL (t)	2350	95% Percentile (z)	2293
95% USL	3058	99% Percentile (z)	2766

Gamma GOF Test

A-D Test Statistic	0.363	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.106	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.161	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.877	k star (bias corrected MLE)	2.611
Theta hat (MLE)	399.4	Theta star (bias corrected MLE)	440
nu hat (MLE)	172.6	nu star (bias corrected)	156.7
MLE Mean (bias corrected)	1149	MLE Sd (bias corrected)	711.1

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	2562	90% Percentile	2102
95% Hawkins Wixley (HW) Approx. Gamma UPL	2616	95% Percentile	2511
95% WH Approx. Gamma UTL with 95% Coverage	3186	99% Percentile	3405
95% HW Approx. Gamma UTL with 95% Coverage	3312		
95% WH USL	3956	95% HW USL	4198

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level

Lilliefors Test Statistic	0.126	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	3902	90% Percentile (z)	2154
95% UPL (t)	2856	95% Percentile (z)	2711
95% USL	5443	99% Percentile (z)	4174

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	2900
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	2900	95% BCA Bootstrap UTL with 95% Coverage	2720
95% UPL	2680	90% Percentile	1960
90% Chebyshev UPL	3269	95% Percentile	2500
95% Chebyshev UPL	4230	99% Percentile	2784
95% USL	2900		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|manganese (mn)|ml|)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	11
Minimum	36	First Quartile	77
Second Largest	150	Median	110
Maximum	180	Third Quartile	130
Mean	106	SD	36.17
Coefficient of Variation	0.341	Skewness	0.117
Mean of logged Data	4.6	SD of logged Data	0.392

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.566	d2max (for USL)	2.409

Normal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	198.8	90% Percentile (z)	152.4
95% UPL (t)	171.8	95% Percentile (z)	165.5

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

95% USL	193.1	99% Percentile (z)	190.1

Gamma GOF Test

A-D Test Statistic	0.303	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.122	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.994	k star (bias corrected MLE)	6.44
Theta hat (MLE)	13.26	Theta star (bias corrected MLE)	16.46
nu hat (MLE)	239.8	nu star (bias corrected)	193.2
MLE Mean (bias corrected)	106	MLE Sd (bias corrected)	41.77

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	186.9	90% Percentile	161.8
95% Hawkins Wixley (HW) Approx. Gamma UPL	190.1	95% Percentile	182.7
95% WH Approx. Gamma UTL with 95% Coverage	232.4	99% Percentile	226.4
95% HW Approx. Gamma UTL with 95% Coverage	239.9		
95% WH USL	222.3	95% HW USL	228.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	272	90% Percentile (z)	164.4
95% UPL (t)	203	95% Percentile (z)	189.6
95% USL	255.8	99% Percentile (z)	247.6

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	15	95% UTL with 95% Coverage	180
Approx, f used to compute achieved CC	0.789	Approximate Actual Confidence Coefficient achieved by UTL	0.537
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	180	95% BCA Bootstrap UTL with 95% Coverage	180
95% UPL	180	90% Percentile	142
90% Chebyshev UPL	218.1	95% Percentile	159
95% Chebyshev UPL	268.8	99% Percentile	175.8
95% USL	180		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|manganese (mn)|wsl|)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	13
Minimum	30	First Quartile	43
Second Largest	120	Median	57
Maximum	120	Third Quartile	97
Mean	70.6	SD	33.11
Coefficient of Variation	0.469	Skewness	0.462
Mean of logged Data	4.151	SD of logged Data	0.479

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.566	d2max (for USL)	2.409

Normal GOF Test

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	155.6	90% Percentile (z)	113
95% UPL (t)	130.8	95% Percentile (z)	125.1
95% USL	150.4	99% Percentile (z)	147.6

Gamma GOF Test

A-D Test Statistic	0.595	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.898	k star (bias corrected MLE)	3.963
Theta hat (MLE)	14.41	Theta star (bias corrected MLE)	17.81
nu hat (MLE)	146.9	nu star (bias corrected)	118.9
MLE Mean (bias corrected)	70.6	MLE Sd (bias corrected)	35.46

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	141.6	90% Percentile	118.1
95% Hawkins Wixley (HW) Approx. Gamma UPL	143.7	95% Percentile	137.2
95% WH Approx. Gamma UTL with 95% Coverage	184.7	99% Percentile	177.9
95% HW Approx. Gamma UTL with 95% Coverage	190.9		
95% WH USL	175	95% HW USL	180.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.22	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	217.2	90% Percentile (z)	117.4
95% UPL (t)	151.9	95% Percentile (z)	139.7
95% USL	201.5	99% Percentile (z)	193.6

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	15	95% UTL with 95% Coverage	120
Approx, f used to compute achieved CC	0.789	Approximate Actual Confidence Coefficient achieved by UTL	0.537
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	120	95% BCA Bootstrap UTL with 95% Coverage	120
95% UPL	120	90% Percentile	120
90% Chebyshev UPL	173.2	95% Percentile	120
95% Chebyshev UPL	219.7	99% Percentile	120
95% USL	120		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|nickel|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	24
Minimum	1.9	First Quartile	4.2
Second Largest	12	Median	5.9
Maximum	14	Third Quartile	7.9
Mean	6.403	SD	3.047
Coefficient of Variation	0.476	Skewness	0.721
Mean of logged Data	1.742	SD of logged Data	0.5

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	13.17	90% Percentile (z)	10.31
95% UPL (t)	11.67	95% Percentile (z)	11.42
95% USL	14.77	99% Percentile (z)	13.49

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Gamma GOF Test

A-D Test Statistic	0.307	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.112	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.53	k star (bias corrected MLE)	4.099
Theta hat (MLE)	1.414	Theta star (bias corrected MLE)	1.562
nu hat (MLE)	271.8	nu star (bias corrected)	246
MLE Mean (bias corrected)	6.403	MLE Sd (bias corrected)	3.163

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	12.52	90% Percentile	10.64
95% Hawkins Wixley (HW) Approx. Gamma UPL	12.72	95% Percentile	12.33
95% WH Approx. Gamma UTL with 95% Coverage	15.03	99% Percentile	15.94
95% HW Approx. Gamma UTL with 95% Coverage	15.47		
95% WH USL	18.05	95% HW USL	18.85

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	17.35	90% Percentile (z)	10.85
95% UPL (t)	13.56	95% Percentile (z)	13.01
95% USL	22.56	99% Percentile (z)	18.29

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	14
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	14	95% BCA Bootstrap UTL with 95% Coverage	13.1
95% UPL	12.9	90% Percentile	10.02
90% Chebyshev UPL	15.7	95% Percentile	12
95% Chebyshev UPL	19.91	99% Percentile	13.42
95% USL	14		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|potassium (k)|)

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	24
Minimum	170	First Quartile	247.5
Second Largest	810	Median	335
Maximum	940	Third Quartile	627.5
Mean	436.7	SD	218.8
Coefficient of Variation	0.501	Skewness	0.621
Mean of logged Data	5.958	SD of logged Data	0.502

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	922.4	90% Percentile (z)	717.1
95% UPL (t)	814.6	95% Percentile (z)	796.6
95% USL	1037	99% Percentile (z)	945.7

Gamma GOF Test

A-D Test Statistic	1.149	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.161	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.276	k star (bias corrected MLE)	3.87
Theta hat (MLE)	102.1	Theta star (bias corrected MLE)	112.8
nu hat (MLE)	256.5	nu star (bias corrected)	232.2
MLE Mean (bias corrected)	436.7	MLE Sd (bias corrected)	222

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	867.8	90% Percentile	734.2
95% Hawkins Wixley (HW) Approx. Gamma UPL	878.6	95% Percentile	853.9
95% WH Approx. Gamma UTL with 95% Coverage	1047	99% Percentile	1110
95% HW Approx. Gamma UTL with 95% Coverage	1073		
95% WH USL	1262	95% HW USL	1313

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	1179	90% Percentile (z)	736
95% UPL (t)	920.5	95% Percentile (z)	883.3
95% USL	1535	99% Percentile (z)	1244

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	940
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	940	95% BCA Bootstrap UTL with 95% Coverage	881.5
95% UPL	868.5	90% Percentile	713
90% Chebyshev UPL	1104	95% Percentile	778.5
95% Chebyshev UPL	1406	99% Percentile	902.3
95% USL	940		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|sodium (na)|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	27
Minimum	38	First Quartile	51.25
Second Largest	100	Median	58.5
Maximum	200	Third Quartile	70.5
Mean	65.1	SD	28.84
Coefficient of Variation	0.443	Skewness	3.75
Mean of logged Data	4.119	SD of logged Data	0.311

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.618	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	129.1	90% Percentile (z)	102.1
95% UPL (t)	114.9	95% Percentile (z)	112.5
95% USL	144.3	99% Percentile (z)	132.2

Gamma GOF Test

A-D Test Statistic	1.436	**Anderson-Darling Gamma GOF Test**

5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.161	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.16	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.898	k star (bias corrected MLE)	8.03
Theta hat (MLE)	7.316	Theta star (bias corrected MLE)	8.107
nu hat (MLE)	533.9	nu star (bias corrected)	481.8
MLE Mean (bias corrected)	65.1	MLE Sd (bias corrected)	22.97

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	107.4	90% Percentile	95.73
95% Hawkins Wixley (HW) Approx. Gamma UPL	106.8	95% Percentile	106.9
95% WH Approx. Gamma UTL with 95% Coverage	123.4	99% Percentile	130.1
95% HW Approx. Gamma UTL with 95% Coverage	123		
95% WH USL	142	95% HW USL	142.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	122.5	90% Percentile (z)	91.53
95% UPL (t)	105.1	95% Percentile (z)	102.5
95% USL	144.2	99% Percentile (z)	126.6

Nonparametric Distribution Free Background Statistics

Data appear Approximate Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	200
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	200	95% BCA Bootstrap UTL with 95% Coverage	155
95% UPL	145	90% Percentile	80
90% Chebyshev UPL	153.1	95% Percentile	91
95% Chebyshev UPL	192.9	99% Percentile	171
95% USL	200		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|vanadium|)

General Statistics

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Total Number of Observations	30	Number of Distinct Observations	20
Minimum	7.1	First Quartile	12.25
Second Largest	29	Median	18
Maximum	30	Third Quartile	24
Mean	18.29	SD	6.822
Coefficient of Variation	0.373	Skewness	0.0491
Mean of logged Data	2.831	SD of logged Data	0.407

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	33.43	90% Percentile (z)	27.03
95% UPL (t)	30.07	95% Percentile (z)	29.51
95% USL	37.02	99% Percentile (z)	34.16

Gamma GOF Test

A-D Test Statistic	0.786	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.157	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.812	k star (bias corrected MLE)	6.153
Theta hat (MLE)	2.685	Theta star (bias corrected MLE)	2.972
nu hat (MLE)	408.7	nu star (bias corrected)	369.2
MLE Mean (bias corrected)	18.29	MLE Sd (bias corrected)	7.373

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	32.27	90% Percentile	28.14
95% Hawkins Wixley (HW) Approx. Gamma UPL	32.69	95% Percentile	31.86
95% WH Approx. Gamma UTL with 95% Coverage	37.68	99% Percentile	39.63
95% HW Approx. Gamma UTL with 95% Coverage	38.53		
95% WH USL	44.08	95% HW USL	45.58

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	41.86	90% Percentile (z)	28.57

95% UPL (t)	34.26	95% Percentile (z)	33.13
95% USL	51.83	99% Percentile (z)	43.71

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	30
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	30	95% BCA Bootstrap UTL with 95% Coverage	30
95% UPL	29.45	90% Percentile	26.1
90% Chebyshev UPL	39.09	95% Percentile	28.1
95% Chebyshev UPL	48.52	99% Percentile	29.71
95% USL	30		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|metals|zinc|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	18
Minimum	5	First Quartile	12
Second Largest	25	Median	14
Maximum	39	Third Quartile	21
Mean	16.31	SD	7.096
Coefficient of Variation	0.435	Skewness	1.024
Mean of logged Data	2.699	SD of logged Data	0.449

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	32.06	90% Percentile (z)	25.4
95% UPL (t)	28.56	95% Percentile (z)	27.98
95% USL	35.79	99% Percentile (z)	32.82

Gamma GOF Test

A-D Test Statistic	0.323	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**Kolmogorov-Smirnov Gamma GOF Test**

5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.565	k star (bias corrected MLE)	5.031
Theta hat (MLE)	2.931	Theta star (bias corrected MLE)	3.242
nu hat (MLE)	333.9	nu star (bias corrected)	301.8
MLE Mean (bias corrected)	16.31	MLE Sd (bias corrected)	7.271

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	30.2	90% Percentile	26.04
95% Hawkins Wixley (HW) Approx. Gamma UPL	30.61	95% Percentile	29.81
95% WH Approx. Gamma UTL with 95% Coverage	35.73	99% Percentile	37.77
95% HW Approx. Gamma UTL with 95% Coverage	36.6		
95% WH USL	42.32	95% HW USL	43.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0903	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	40.31	90% Percentile (z)	26.44
95% UPL (t)	32.3	95% Percentile (z)	31.13
95% USL	51.03	99% Percentile (z)	42.28

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	39
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	39	95% BCA Bootstrap UTL with 95% Coverage	32.7
95% UPL	31.3	90% Percentile	24.1
90% Chebyshev UPL	37.95	95% Percentile	25
95% Chebyshev UPL	47.75	99% Percentile	34.94
95% USL	39		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|1-methylnaphthalene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	20		

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Number of Detects	7	Number of Non-Detects	23
Number of Distinct Detects	6	Number of Distinct Non-Detects	14
Minimum Detect	8.2000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.0086	Maximum Non-Detect	0.016
Variance Detected	9.3901E-6	Percent Non-Detects	76.67%
Mean Detected	0.0038	SD Detected	0.00306
Mean of Detected Logged Data	-5.896	SD of Detected Logged Data	0.899

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0015	KM SD	0.00193
95% UTL95% Coverage	0.00578	95% KM UPL (t)	0.00483
90% KM Percentile (z)	0.00397	95% KM Percentile (z)	0.00467
99% KM Percentile (z)	0.00599	95% KM USL	0.00679

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00164	SD	0.00238
95% UTL95% Coverage	0.00692	95% UPL (t)	0.00574
90% Percentile (z)	0.00468	95% Percentile (z)	0.00555
99% Percentile (z)	0.00717	95% USL	0.00816

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.524	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.295	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.316	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.69	k star (bias corrected MLE)	1.061
Theta hat (MLE)	0.00225	Theta star (bias corrected MLE)	0.00358
nu hat (MLE)	23.66	nu star (bias corrected)	14.85
MLE Mean (bias corrected)	0.0038		
MLE Sd (bias corrected)	0.00369	95% Percentile of Chisquare (2kstar)	6.225

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	8.2000E-4	Mean	0.00855

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Maximum	0.01	Median	0.01
SD	0.00301	CV	0.352
k hat (MLE)	3.605	k star (bias corrected MLE)	3.267
Theta hat (MLE)	0.00237	Theta star (bias corrected MLE)	0.00262
nu hat (MLE)	216.3	nu star (bias corrected)	196
MLE Mean (bias corrected)	0.00855	MLE Sd (bias corrected)	0.00473
95% Percentile of Chisquare (2kstar)	13.38	90% Percentile	0.0149
95% Percentile	0.0175	99% Percentile	0.0232

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0217	0.0236	95% Approx. Gamma UPL	0.0178	0.0189
95% Gamma USL	0.0264	0.0294			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0015	SD (KM)	0.00193
Variance (KM)	3.7249E-6	SE of Mean (KM)	3.9151E-4
k hat (KM)	0.601	k star (KM)	0.563
nu hat (KM)	36.08	nu star (KM)	33.81
theta hat (KM)	0.00249	theta star (KM)	0.00266
80% gamma percentile (KM)	0.00247	90% gamma percentile (KM)	0.00395
95% gamma percentile (KM)	0.00551	99% gamma percentile (KM)	0.00931

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.00521	0.00514	95% Approx. Gamma UPL	0.00394	0.00382
95% KM Gamma Percentile	0.00375	0.00363	95% Gamma USL	0.00683	0.00688

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00106	Mean in Log Scale	-7.921
SD in Original Scale	0.00208	SD in Log Scale	1.318
95% UTL95% Coverage	0.00677	95% BCA UTL95% Coverage	0.0086
95% Bootstrap (%) UTL95% Coverage	0.0086	95% UPL (t)	0.00354
90% Percentile (z)	0.00197	95% Percentile (z)	0.00317
99% Percentile (z)	0.00779	95% USL	0.0135

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.89	95% KM UTL (Lognormal)95% Coverage	0.00494
KM SD of Logged Data	0.711	95% KM UPL (Lognormal)	0.00348
95% KM Percentile Lognormal (z)	0.00328	95% KM USL (Lognormal)	0.00717

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00164	Mean in Log Scale	-7.111
SD in Original Scale	0.00238	SD in Log Scale	1.078

95% UTL95% Coverage	0.00894	95% UPL (t)	0.00526
90% Percentile (z)	0.00325	95% Percentile (z)	0.00481
99% Percentile (z)	0.01	95% USL	0.0158

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.016
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0119
95% USL	0.016	95% KM Chebyshev UPL	0.01

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|2-methylnaphthalene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	23		
Number of Detects	15	Number of Non-Detects	15
Number of Distinct Detects	14	Number of Distinct Non-Detects	10
Minimum Detect	7.4000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.0068	Maximum Non-Detect	0.016
Variance Detected	3.3988E-6	Percent Non-Detects	50%
Mean Detected	0.00211	SD Detected	0.00184
Mean of Detected Logged Data	-6.444	SD of Detected Logged Data	0.735

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.289	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00151	KM SD	0.00149
95% UTL95% Coverage	0.00482	95% KM UPL (t)	0.00408
90% KM Percentile (z)	0.00342	95% KM Percentile (z)	0.00396
99% KM Percentile (z)	0.00498	95% KM USL	0.0056

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00183	SD	0.00201
95% UTL95% Coverage	0.0063	95% UPL (t)	0.00531

90% Percentile (z)	0.00441	95% Percentile (z)	0.00514
99% Percentile (z)	0.00652	95% USL	0.00736

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.102	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.278	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.225	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.917	k star (bias corrected MLE)	1.578
Theta hat (MLE)	0.0011	Theta star (bias corrected MLE)	0.00134
nu hat (MLE)	57.5	nu star (bias corrected)	47.34
MLE Mean (bias corrected)	0.00211		
MLE Sd (bias corrected)	0.00168	95% Percentile of Chisquare (2kstar)	8.083

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.4000E-4	Mean	0.00606
Maximum	0.01	Median	0.0084
SD	0.00421	CV	0.696
k hat (MLE)	1.339	k star (bias corrected MLE)	1.227
Theta hat (MLE)	0.00452	Theta star (bias corrected MLE)	0.00493
nu hat (MLE)	80.35	nu star (bias corrected)	73.64
MLE Mean (bias corrected)	0.00606	MLE Sd (bias corrected)	0.00547
95% Percentile of Chisquare (2kstar)	6.846	90% Percentile	0.0133
95% Percentile	0.0169	99% Percentile	0.0252

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0234	0.026	95% Approx. Gamma UPL	0.0175	0.0187
95% Gamma USL	0.031	0.0358			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00151	SD (KM)	0.00149
Variance (KM)	2.2174E-6	SE of Mean (KM)	2.9710E-4
k hat (KM)	1.031	k star (KM)	0.95
nu hat (KM)	61.87	nu star (KM)	57.01
theta hat (KM)	0.00147	theta star (KM)	0.00159
80% gamma percentile (KM)	0.00244	90% gamma percentile (KM)	0.00353
95% gamma percentile (KM)	0.00461	99% gamma percentile (KM)	0.00715

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.00474	0.00475	95% Approx. Gamma UPL	0.00369	0.00364

95% KM Gamma Percentile	0.00353	0.00348	95% Gamma USL	0.00606	0.0062

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.249	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00129	Mean in Log Scale	-7.118
SD in Original Scale	0.00154	SD in Log Scale	0.931
95% UTL95% Coverage	0.0064	95% BCA UTL95% Coverage	0.0068
95% Bootstrap (%) UTL95% Coverage	0.0068	95% UPL (t)	0.00405
90% Percentile (z)	0.00267	95% Percentile (z)	0.00375
99% Percentile (z)	0.00707	95% USL	0.0104

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.774	95% KM UTL (Lognormal)95% Coverage	0.00486
KM SD of Logged Data	0.652	95% KM UPL (Lognormal)	0.00352
95% KM Percentile Lognormal (z)	0.00334	95% KM USL (Lognormal)	0.00684

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00183	Mean in Log Scale	-6.784
SD in Original Scale	0.00201	SD in Log Scale	0.972
95% UTL95% Coverage	0.00979	95% UPL (t)	0.00606
90% Percentile (z)	0.00393	95% Percentile (z)	0.0056
99% Percentile (z)	0.0109	95% USL	0.0163

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.016
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0119
95% USL	0.016	95% KM Chebyshev UPL	0.00811

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|acenaphthene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	22		
Number of Detects	9	Number of Non-Detects	21
Number of Distinct Detects	9	Number of Distinct Non-Detects	14

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Minimum Detect	7.5000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.025	Maximum Non-Detect	0.0079
Variance Detected	9.7285E-5	Percent Non-Detects	70%
Mean Detected	0.00836	SD Detected	0.00986
Mean of Detected Logged Data	-5.507	SD of Detected Logged Data	1.329

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.747	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00303	KM SD	0.00618
95% UTL95% Coverage	0.0167	95% KM UPL (t)	0.0137
90% KM Percentile (z)	0.0109	95% KM Percentile (z)	0.0132
99% KM Percentile (z)	0.0174	95% KM USL	0.02

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00293	SD	0.00635
95% UTL95% Coverage	0.017	95% UPL (t)	0.0139
90% Percentile (z)	0.0111	95% Percentile (z)	0.0134
99% Percentile (z)	0.0177	95% USL	0.0204

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.555	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.269	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.289	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.818	k star (bias corrected MLE)	0.619
Theta hat (MLE)	0.0102	Theta star (bias corrected MLE)	0.0135
nu hat (MLE)	14.72	nu star (bias corrected)	11.15
MLE Mean (bias corrected)	0.00836		
MLE Sd (bias corrected)	0.0106	95% Percentile of Chisquare (2kstar)	4.407

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.5000E-4	Mean	0.00951
Maximum	0.025	Median	0.01
SD	0.00524	CV	0.551

k hat (MLE)	2.423	k star (bias corrected MLE)	2.203
Theta hat (MLE)	0.00392	Theta star (bias corrected MLE)	0.00432
nu hat (MLE)	145.4	nu star (bias corrected)	132.2
MLE Mean (bias corrected)	0.00951	MLE Sd (bias corrected)	0.00641
95% Percentile of Chisquare (2kstar)	10.14	90% Percentile	0.0181
95% Percentile	0.0219	99% Percentile	0.0303

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0281	0.0305	95% Approx. Gamma UPL	0.0223	0.0236
95% Gamma USL	0.0352	0.0395			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00303	SD (KM)	0.00618
Variance (KM)	3.8169E-5	SE of Mean (KM)	0.0012
k hat (KM)	0.24	k star (KM)	0.238
nu hat (KM)	14.42	nu star (KM)	14.31
theta hat (KM)	0.0126	theta star (KM)	0.0127
80% gamma percentile (KM)	0.00432	90% gamma percentile (KM)	0.00912
95% gamma percentile (KM)	0.0149	99% gamma percentile (KM)	0.0303

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0138	0.0134	95% Approx. Gamma UPL	0.00954	0.009
95% KM Gamma Percentile	0.00893	0.00838	95% Gamma USL	0.0195	0.0197

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00258	Mean in Log Scale	-8.295
SD in Original Scale	0.00646	SD in Log Scale	2.095
95% UTL95% Coverage	0.0262	95% BCA UTL95% Coverage	0.025
95% Bootstrap (%) UTL95% Coverage	0.025	95% UPL (t)	0.00932
90% Percentile (z)	0.00366	95% Percentile (z)	0.00785
99% Percentile (z)	0.0327	95% USL	0.0787

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.706	95% KM UTL (Lognormal)95% Coverage	0.0125
KM SD of Logged Data	1.048	95% KM UPL (Lognormal)	0.00748
95% KM Percentile Lognormal (z)	0.00686	95% KM USL (Lognormal)	0.0217

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00293	Mean in Log Scale	-7.038
SD in Original Scale	0.00635	SD in Log Scale	1.318
95% UTL95% Coverage	0.0164	95% UPL (t)	0.00856
90% Percentile (z)	0.00476	95% Percentile (z)	0.00768

99% Percentile (z)	0.0189	95% USL	0.0328

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.025
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0245
95% USL	0.025	95% KM Chebyshev UPL	0.0304

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|anthracene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	23		
Number of Detects	13	Number of Non-Detects	17
Number of Distinct Detects	12	Number of Distinct Non-Detects	12
Minimum Detect	7.6000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.065	Maximum Non-Detect	8.8000E-4
Variance Detected	4.7225E-4	Percent Non-Detects	56.67%
Mean Detected	0.0146	SD Detected	0.0217
Mean of Detected Logged Data	-5.195	SD of Detected Logged Data	1.453

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.668	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.34	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00675	KM SD	0.0154
95% UTL95% Coverage	0.0409	95% KM UPL (t)	0.0333
90% KM Percentile (z)	0.0265	95% KM Percentile (z)	0.032
99% KM Percentile (z)	0.0425	95% KM USL	0.049

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00656	SD	0.0157
95% UTL95% Coverage	0.0414	95% UPL (t)	0.0337
90% Percentile (z)	0.0267	95% Percentile (z)	0.0324
99% Percentile (z)	0.0431	95% USL	0.0497

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.734	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.78	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.246	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.248	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.632	k star (bias corrected MLE)	0.537
Theta hat (MLE)	0.0232	Theta star (bias corrected MLE)	0.0272
nu hat (MLE)	16.43	nu star (bias corrected)	13.97
MLE Mean (bias corrected)	0.0146		
MLE Sd (bias corrected)	0.02	95% Percentile of Chisquare (2kstar)	4.023

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.6000E-4	Mean	0.012
Maximum	0.065	Median	0.01
SD	0.0142	CV	1.18
k hat (MLE)	1.281	k star (bias corrected MLE)	1.175
Theta hat (MLE)	0.00937	Theta star (bias corrected MLE)	0.0102
nu hat (MLE)	76.87	nu star (bias corrected)	70.51
MLE Mean (bias corrected)	0.012	MLE Sd (bias corrected)	0.0111
95% Percentile of Chisquare (2kstar)	6.654	90% Percentile	0.0266
95% Percentile	0.034	99% Percentile	0.051

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0456	0.0481	95% Approx. Gamma UPL	0.034	0.0348
95% Gamma USL	0.0604	0.066			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00675	SD (KM)	0.0154
Variance (KM)	2.3638E-4	SE of Mean (KM)	0.00292
k hat (KM)	0.193	k star (KM)	0.196
nu hat (KM)	11.56	nu star (KM)	11.73
theta hat (KM)	0.035	theta star (KM)	0.0345
80% gamma percentile (KM)	0.00879	90% gamma percentile (KM)	0.0204
95% gamma percentile (KM)	0.035	99% gamma percentile (KM)	0.0752

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0343	0.034	95% Approx. Gamma UPL	0.0227	0.0215
95% KM Gamma Percentile	0.0211	0.0198	95% Gamma USL	0.0504	0.0528

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0064	Mean in Log Scale	-7.575
SD in Original Scale	0.0158	SD in Log Scale	2.375
95% UTL95% Coverage	0.1	95% BCA UTL95% Coverage	0.065
95% Bootstrap (%) UTL95% Coverage	0.065	95% UPL (t)	0.0311
90% Percentile (z)	0.0108	95% Percentile (z)	0.0255
99% Percentile (z)	0.129	95% USL	0.348

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.35	95% KM UTL (Lognormal)95% Coverage	0.0362
KM SD of Logged Data	1.366	95% KM UPL (Lognormal)	0.0185
95% KM Percentile Lognormal (z)	0.0165	95% KM USL (Lognormal)	0.0742

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00656	Mean in Log Scale	-6.702
SD in Original Scale	0.0157	SD in Log Scale	1.635
95% UTL95% Coverage	0.0463	95% UPL (t)	0.0207
90% Percentile (z)	0.00998	95% Percentile (z)	0.0181
99% Percentile (z)	0.055	95% USL	0.109

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.065
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0606
95% USL	0.065	95% KM Chebyshev UPL	0.0749

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|benzo(a)anthracene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	27		
Number of Detects	24	Number of Non-Detects	6
Number of Distinct Detects	22	Number of Distinct Non-Detects	6
Minimum Detect	8.8000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.22	Maximum Non-Detect	8.8000E-4

Variance Detected	0.00356	Percent Non-Detects	20%
Mean Detected	0.0309	SD Detected	0.0596
Mean of Detected Logged Data	-4.91	SD of Detected Logged Data	1.73

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.55	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.366	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0249	KM SD	0.0536
95% UTL95% Coverage	0.144	95% KM UPL (t)	0.117
90% KM Percentile (z)	0.0935	95% KM Percentile (z)	0.113
99% KM Percentile (z)	0.15	95% KM USL	0.172

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0248	SD	0.0545
95% UTL95% Coverage	0.146	95% UPL (t)	0.119
90% Percentile (z)	0.0947	95% Percentile (z)	0.114
99% Percentile (z)	0.152	95% USL	0.174

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.369	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.817	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.189	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.451	k star (bias corrected MLE)	0.422
Theta hat (MLE)	0.0686	Theta star (bias corrected MLE)	0.0732
nu hat (MLE)	21.63	nu star (bias corrected)	20.26
MLE Mean (bias corrected)	0.0309		
MLE Sd (bias corrected)	0.0476	95% Percentile of Chisquare (2kstar)	3.442

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	8.8000E-4	Mean	0.0267
Maximum	0.22	Median	0.01
SD	0.0538	CV	2.013
k hat (MLE)	0.515	k star (bias corrected MLE)	0.486
Theta hat (MLE)	0.0518	Theta star (bias corrected MLE)	0.055

nu hat (MLE)	30.93	nu star (bias corrected)	29.17
MLE Mean (bias corrected)	0.0267	MLE Sd (bias corrected)	0.0383
95% Percentile of Chisquare (2kstar)	3.772	90% Percentile	0.0727
95% Percentile	0.104	99% Percentile	0.18

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.142	0.15	95% Approx. Gamma UPL	0.095	0.0949
95% Gamma USL	0.206	0.231			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0249	SD (KM)	0.0536
Variance (KM)	0.00287	SE of Mean (KM)	0.00999
k hat (KM)	0.215	k star (KM)	0.216
nu hat (KM)	12.91	nu star (KM)	12.95
theta hat (KM)	0.116	theta star (KM)	0.115
80% gamma percentile (KM)	0.034	90% gamma percentile (KM)	0.0751
95% gamma percentile (KM)	0.125	99% gamma percentile (KM)	0.262

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.138	0.146	95% Approx. Gamma UPL	0.0894	0.0884
95% KM Gamma Percentile	0.0826	0.0808	95% Gamma USL	0.207	0.234

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0247	Mean in Log Scale	-5.694
SD in Original Scale	0.0546	SD in Log Scale	2.218
95% UTL95% Coverage	0.462	95% BCA UTL95% Coverage	0.22
95% Bootstrap (%) UTL95% Coverage	0.22	95% UPL (t)	0.155
90% Percentile (z)	0.0577	95% Percentile (z)	0.129
99% Percentile (z)	0.585	95% USL	1.481

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.375	95% KM UTL (Lognormal)95% Coverage	0.239
KM SD of Logged Data	1.777	95% KM UPL (Lognormal)	0.0997
95% KM Percentile Lognormal (z)	0.0861	95% KM USL (Lognormal)	0.609

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0248	Mean in Log Scale	-5.494
SD in Original Scale	0.0545	SD in Log Scale	1.945
95% UTL95% Coverage	0.309	95% UPL (t)	0.118
90% Percentile (z)	0.0497	95% Percentile (z)	0.101
99% Percentile (z)	0.379	95% USL	0.857

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.22
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.209
95% USL	0.22	95% KM Chebyshev UPL	0.262

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|benzo(a)pyrene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	27		
Number of Detects	22	Number of Non-Detects	8
Number of Distinct Detects	22	Number of Distinct Non-Detects	6
Minimum Detect	7.6000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.53	Maximum Non-Detect	8.8000E-4
Variance Detected	0.0133	Percent Non-Detects	26.67%
Mean Detected	0.0442	SD Detected	0.115
Mean of Detected Logged Data	-4.877	SD of Detected Logged Data	1.828

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.414	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.391	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0326	KM SD	0.0983
95% UTL95% Coverage	0.251	95% KM UPL (t)	0.202
90% KM Percentile (z)	0.159	95% KM Percentile (z)	0.194
99% KM Percentile (z)	0.261	95% KM USL	0.303

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0325	SD	0.1
95% UTL95% Coverage	0.255	95% UPL (t)	0.205
90% Percentile (z)	0.161	95% Percentile (z)	0.197
99% Percentile (z)	0.265	95% USL	0.307

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.554	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.831	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.199	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.378	k star (bias corrected MLE)	0.357
Theta hat (MLE)	0.117	Theta star (bias corrected MLE)	0.124
nu hat (MLE)	16.62	nu star (bias corrected)	15.69
MLE Mean (bias corrected)	0.0442		
MLE Sd (bias corrected)	0.074	95% Percentile of Chisquare (2kstar)	3.081

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.6000E-4	Mean	0.0351
Maximum	0.53	Median	0.01
SD	0.0993	CV	2.831
k hat (MLE)	0.445	k star (bias corrected MLE)	0.423
Theta hat (MLE)	0.0789	Theta star (bias corrected MLE)	0.083
nu hat (MLE)	26.69	nu star (bias corrected)	25.35
MLE Mean (bias corrected)	0.0351	MLE Sd (bias corrected)	0.054
95% Percentile of Chisquare (2kstar)	3.445	90% Percentile	0.0981
95% Percentile	0.143	99% Percentile	0.255

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.181	0.181	95% Approx. Gamma UPL	0.119	0.113
95% Gamma USL	0.267	0.284			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0326	SD (KM)	0.0983
Variance (KM)	0.00967	SE of Mean (KM)	0.0184
k hat (KM)	0.11	k star (KM)	0.121
nu hat (KM)	6.596	nu star (KM)	7.269
theta hat (KM)	0.297	theta star (KM)	0.269
80% gamma percentile (KM)	0.0289	90% gamma percentile (KM)	0.0926
95% gamma percentile (KM)	0.186	99% gamma percentile (KM)	0.47

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.173	0.173	95% Approx. Gamma UPL	0.109	0.102
95% KM Gamma Percentile	0.1	0.0926	95% Gamma USL	0.264	0.284

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**

5% Shapiro Wilk Critical Value	0.911	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.104	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0324	Mean in Log Scale	-5.98
SD in Original Scale	0.1	SD in Log Scale	2.439
95% UTL95% Coverage	0.568	95% BCA UTL95% Coverage	0.53
95% Bootstrap (%) UTL95% Coverage	0.53	95% UPL (t)	0.171
90% Percentile (z)	0.0576	95% Percentile (z)	0.14
99% Percentile (z)	0.737	95% USL	2.046

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.503	95% KM UTL (Lognormal)95% Coverage	0.247
KM SD of Logged Data	1.848	95% KM UPL (Lognormal)	0.0992
95% KM Percentile Lognormal (z)	0.0852	95% KM USL (Lognormal)	0.651

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0325	Mean in Log Scale	-5.667
SD in Original Scale	0.1	SD in Log Scale	2.048
95% UTL95% Coverage	0.326	95% UPL (t)	0.119
90% Percentile (z)	0.0477	95% Percentile (z)	0.1
99% Percentile (z)	0.405	95% USL	0.955

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.53
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.332
95% USL	0.53	95% KM Chebyshev UPL	0.468

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|benzo(b)fluoranthene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	29		
Number of Detects	26	Number of Non-Detects	4
Number of Distinct Detects	25	Number of Distinct Non-Detects	4
Minimum Detect	0.0013	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.3	Maximum Non-Detect	8.6000E-4
Variance Detected	0.00579	Percent Non-Detects	13.33%
Mean Detected	0.0384	SD Detected	0.0761

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Mean of Detected Logged Data	-4.686	SD of Detected Logged Data	1.691

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.539	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0333	KM SD	0.0706
95% UTL95% Coverage	0.19	95% KM UPL (t)	0.155
90% KM Percentile (z)	0.124	95% KM Percentile (z)	0.149
99% KM Percentile (z)	0.198	95% KM USL	0.227

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0333	SD	0.0718
95% UTL95% Coverage	0.193	95% UPL (t)	0.157
90% Percentile (z)	0.125	95% Percentile (z)	0.151
99% Percentile (z)	0.2	95% USL	0.23

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.636	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.819	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.185	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.182	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.453	k star (bias corrected MLE)	0.426
Theta hat (MLE)	0.0848	Theta star (bias corrected MLE)	0.09
nu hat (MLE)	23.54	nu star (bias corrected)	22.15
MLE Mean (bias corrected)	0.0384		
MLE Sd (bias corrected)	0.0588	95% Percentile of Chisquare (2kstar)	3.464

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0013	Mean	0.0346
Maximum	0.3	Median	0.00975
SD	0.0713	CV	2.062
k hat (MLE)	0.487	k star (bias corrected MLE)	0.46
Theta hat (MLE)	0.0711	Theta star (bias corrected MLE)	0.0752
nu hat (MLE)	29.2	nu star (bias corrected)	27.61
MLE Mean (bias corrected)	0.0346	MLE Sd (bias corrected)	0.051

95% Percentile of Chisquare (2kstar)	3.641	90% Percentile	0.0951
95% Percentile	0.137	99% Percentile	0.24

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.187	0.196	95% Approx. Gamma UPL	0.124	0.123
95% Gamma USL	0.274	0.305			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0333	SD (KM)	0.0706
Variance (KM)	0.00498	SE of Mean (KM)	0.0131
k hat (KM)	0.223	k star (KM)	0.223
nu hat (KM)	13.38	nu star (KM)	13.38
theta hat (KM)	0.149	theta star (KM)	0.15
80% gamma percentile (KM)	0.0463	90% gamma percentile (KM)	0.101
95% gamma percentile (KM)	0.167	99% gamma percentile (KM)	0.346

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.185	0.196	95% Approx. Gamma UPL	0.12	0.119
95% KM Gamma Percentile	0.111	0.109	95% Gamma USL	0.276	0.313

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0333	Mean in Log Scale	-5.195
SD in Original Scale	0.0718	SD in Log Scale	2.052
95% UTL95% Coverage	0.527	95% BCA UTL95% Coverage	0.3
95% Bootstrap (%) UTL95% Coverage	0.3	95% UPL (t)	0.192
90% Percentile (z)	0.0768	95% Percentile (z)	0.162
99% Percentile (z)	0.655	95% USL	1.548

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.026	95% KM UTL (Lognormal)95% Coverage	0.334
KM SD of Logged Data	1.771	95% KM UPL (Lognormal)	0.14
95% KM Percentile Lognormal (z)	0.121	95% KM USL (Lognormal)	0.848

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0333	Mean in Log Scale	-5.107
SD in Original Scale	0.0718	SD in Log Scale	1.912
95% UTL95% Coverage	0.423	95% UPL (t)	0.165
90% Percentile (z)	0.0702	95% Percentile (z)	0.141
99% Percentile (z)	0.518	95% USL	1.153

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.3
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.273
95% USL	0.3	95% KM Chebyshev UPL	0.346

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|benzo(g,h,i)perylene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	26		
Number of Detects	20	Number of Non-Detects	10
Number of Distinct Detects	19	Number of Distinct Non-Detects	9
Minimum Detect	7.9000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.1	Maximum Non-Detect	0.0086
Variance Detected	7.4022E-4	Percent Non-Detects	33.33%
Mean Detected	0.0147	SD Detected	0.0272
Mean of Detected Logged Data	-5.35	SD of Detected Logged Data	1.471

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.547	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0101	KM SD	0.0226
95% UTL95% Coverage	0.0603	95% KM UPL (t)	0.0491
90% KM Percentile (z)	0.039	95% KM Percentile (z)	0.0473
99% KM Percentile (z)	0.0627	95% KM USL	0.0721

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.01	SD	0.023
95% UTL95% Coverage	0.0611	95% UPL (t)	0.0498
90% Percentile (z)	0.0395	95% Percentile (z)	0.0479
99% Percentile (z)	0.0636	95% USL	0.0732

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.246	**Anderson-Darling GOF Test**

5% A-D Critical Value	0.798	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.207	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.554	k star (bias corrected MLE)	0.505
Theta hat (MLE)	0.0265	Theta star (bias corrected MLE)	0.0291
nu hat (MLE)	22.18	nu star (bias corrected)	20.18
MLE Mean (bias corrected)	0.0147		
MLE Sd (bias corrected)	0.0207	95% Percentile of Chisquare (2kstar)	3.864

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.9000E-4	Mean	0.0131
Maximum	0.1	Median	0.01
SD	0.0221	CV	1.688
k hat (MLE)	0.776	k star (bias corrected MLE)	0.721
Theta hat (MLE)	0.0169	Theta star (bias corrected MLE)	0.0182
nu hat (MLE)	46.59	nu star (bias corrected)	43.26
MLE Mean (bias corrected)	0.0131	MLE Sd (bias corrected)	0.0154
95% Percentile of Chisquare (2kstar)	4.856	90% Percentile	0.0327
95% Percentile	0.0442	99% Percentile	0.0715

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0605	0.0637	95% Approx. Gamma UPL	0.0427	0.0432
95% Gamma USL	0.0842	0.0928			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0101	SD (KM)	0.0226
Variance (KM)	5.1146E-4	SE of Mean (KM)	0.00424
k hat (KM)	0.198	k star (KM)	0.2
nu hat (KM)	11.87	nu star (KM)	12.02
theta hat (KM)	0.0508	theta star (KM)	0.0502
80% gamma percentile (KM)	0.0133	90% gamma percentile (KM)	0.0304
95% gamma percentile (KM)	0.0518	99% gamma percentile (KM)	0.111

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0519	0.0527	95% Approx. Gamma UPL	0.0344	0.0332
95% KM Gamma Percentile	0.0319	0.0305	95% Gamma USL	0.0762	0.0819

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors GOF Test**

5% Lilliefors Critical Value	0.192	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00986	Mean in Log Scale	-6.397
SD in Original Scale	0.0231	SD in Log Scale	1.947
95% UTL95% Coverage	0.126	95% BCA UTL95% Coverage	0.1
95% Bootstrap (%) UTL95% Coverage	0.1	95% UPL (t)	0.0481
90% Percentile (z)	0.0202	95% Percentile (z)	0.041
99% Percentile (z)	0.155	95% USL	0.349

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.956	95% KM UTL (Lognormal)95% Coverage	0.0664
KM SD of Logged Data	1.461	95% KM UPL (Lognormal)	0.0323
95% KM Percentile Lognormal (z)	0.0287	95% KM USL (Lognormal)	0.143

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.01	Mean in Log Scale	-6.102
SD in Original Scale	0.023	SD in Log Scale	1.663
95% UTL95% Coverage	0.0899	95% UPL (t)	0.0396
90% Percentile (z)	0.0189	95% Percentile (z)	0.0345
99% Percentile (z)	0.107	95% USL	0.215

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.1
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0901
95% USL	0.1	95% KM Chebyshev UPL	0.11

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|benzo(k)fluoranthene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	26		
Number of Detects	16	Number of Non-Detects	14
Number of Distinct Detects	16	Number of Distinct Non-Detects	10
Minimum Detect	9.5000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.44	Maximum Non-Detect	8.8000E-4
Variance Detected	0.0118	Percent Non-Detects	46.67%
Mean Detected	0.0421	SD Detected	0.109
Mean of Detected Logged Data	-4.733	SD of Detected Logged Data	1.641

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.414	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.357	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0228	KM SD	0.0795
95% UTL95% Coverage	0.199	95% KM UPL (t)	0.16
90% KM Percentile (z)	0.125	95% KM Percentile (z)	0.154
99% KM Percentile (z)	0.208	95% KM USL	0.241

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0227	SD	0.0809
95% UTL95% Coverage	0.202	95% UPL (t)	0.162
90% Percentile (z)	0.126	95% Percentile (z)	0.156
99% Percentile (z)	0.211	95% USL	0.245

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.429	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.814	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.25	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.23	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.417	k star (bias corrected MLE)	0.381
Theta hat (MLE)	0.101	Theta star (bias corrected MLE)	0.111
nu hat (MLE)	13.35	nu star (bias corrected)	12.18
MLE Mean (bias corrected)	0.0421		
MLE Sd (bias corrected)	0.0683	95% Percentile of Chisquare (2kstar)	3.218

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.5000E-4	Mean	0.0271
Maximum	0.44	Median	0.01
SD	0.0797	CV	2.937
k hat (MLE)	0.582	k star (bias corrected MLE)	0.546
Theta hat (MLE)	0.0467	Theta star (bias corrected MLE)	0.0497
nu hat (MLE)	34.91	nu star (bias corrected)	32.75
MLE Mean (bias corrected)	0.0271	MLE Sd (bias corrected)	0.0367
95% Percentile of Chisquare (2kstar)	4.064	90% Percentile	0.0721
95% Percentile	0.101	99% Percentile	0.172

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.125	0.12	95% Approx. Gamma UPL	0.0851	0.0789
95% Gamma USL	0.179	0.179			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0228	SD (KM)	0.0795
Variance (KM)	0.00631	SE of Mean (KM)	0.015
k hat (KM)	0.0824	k star (KM)	0.0964
nu hat (KM)	4.946	nu star (KM)	5.785
theta hat (KM)	0.277	theta star (KM)	0.237
80% gamma percentile (KM)	0.015	90% gamma percentile (KM)	0.0598
95% gamma percentile (KM)	0.133	99% gamma percentile (KM)	0.369

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.114	0.108	95% Approx. Gamma UPL	0.0714	0.064
95% KM Gamma Percentile	0.0656	0.0582	95% Gamma USL	0.174	0.178

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0225	Mean in Log Scale	-6.768
SD in Original Scale	0.0809	SD in Log Scale	2.55
95% UTL95% Coverage	0.331	95% BCA UTL95% Coverage	0.44
95% Bootstrap (%) UTL95% Coverage	0.44	95% UPL (t)	0.0941
90% Percentile (z)	0.0302	95% Percentile (z)	0.0763
99% Percentile (z)	0.434	95% USL	1.262

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.901	95% KM UTL (Lognormal)95% Coverage	0.12
KM SD of Logged Data	1.705	95% KM UPL (Lognormal)	0.052
95% KM Percentile Lognormal (z)	0.0452	95% KM USL (Lognormal)	0.295

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0227	Mean in Log Scale	-6.191
SD in Original Scale	0.0809	SD in Log Scale	1.976
95% UTL95% Coverage	0.165	95% UPL (t)	0.0622
90% Percentile (z)	0.0258	95% Percentile (z)	0.0529
99% Percentile (z)	0.203	95% USL	0.465

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.44
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.245
95% USL	0.44	95% KM Chebyshev UPL	0.375

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|chrysene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	26		
Number of Detects	23	Number of Non-Detects	7
Number of Distinct Detects	22	Number of Distinct Non-Detects	6
Minimum Detect	7.9000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.2	Maximum Non-Detect	8.8000E-4
Variance Detected	0.00337	Percent Non-Detects	23.33%
Mean Detected	0.0302	SD Detected	0.058
Mean of Detected Logged Data	-4.995	SD of Detected Logged Data	1.782

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.552	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0234	KM SD	0.0512
95% UTL95% Coverage	0.137	95% KM UPL (t)	0.112
90% KM Percentile (z)	0.089	95% KM Percentile (z)	0.108
99% KM Percentile (z)	0.143	95% KM USL	0.164

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0233	SD	0.0522
95% UTL95% Coverage	0.139	95% UPL (t)	0.113
90% Percentile (z)	0.0901	95% Percentile (z)	0.109
99% Percentile (z)	0.145	95% USL	0.166

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.36	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.819	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**

5% K-S Critical Value	0.194	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.434	k star (bias corrected MLE)	0.406
Theta hat (MLE)	0.0697	Theta star (bias corrected MLE)	0.0744
nu hat (MLE)	19.97	nu star (bias corrected)	18.69
MLE Mean (bias corrected)	0.0302		
MLE Sd (bias corrected)	0.0474	95% Percentile of Chisquare (2kstar)	3.359

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.9000E-4	Mean	0.0255
Maximum	0.2	Median	0.01
SD	0.0513	CV	2.01
k hat (MLE)	0.512	k star (bias corrected MLE)	0.483
Theta hat (MLE)	0.0498	Theta star (bias corrected MLE)	0.0528
nu hat (MLE)	30.73	nu star (bias corrected)	28.99
MLE Mean (bias corrected)	0.0255	MLE Sd (bias corrected)	0.0367
95% Percentile of Chisquare (2kstar)	3.758	90% Percentile	0.0695
95% Percentile	0.0992	99% Percentile	0.173

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.136	0.144	95% Approx. Gamma UPL	0.0909	0.091
95% Gamma USL	0.198	0.222			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0234	SD (KM)	0.0512
Variance (KM)	0.00263	SE of Mean (KM)	0.00957
k hat (KM)	0.208	k star (KM)	0.209
nu hat (KM)	12.47	nu star (KM)	12.55
theta hat (KM)	0.112	theta star (KM)	0.112
80% gamma percentile (KM)	0.0315	90% gamma percentile (KM)	0.0706
95% gamma percentile (KM)	0.119	99% gamma percentile (KM)	0.251

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.13	0.137	95% Approx. Gamma UPL	0.0839	0.0823
95% KM Gamma Percentile	0.0774	0.0751	95% Gamma USL	0.196	0.221

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0232	Mean in Log Scale	-5.923
SD in Original Scale	0.0522	SD in Log Scale	2.318
95% UTL95% Coverage	0.46	95% BCA UTL95% Coverage	0.2
95% Bootstrap (%) UTL95% Coverage	0.2	95% UPL (t)	0.147
90% Percentile (z)	0.0522	95% Percentile (z)	0.121
99% Percentile (z)	0.588	95% USL	1.552

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.515	95% KM UTL (Lognormal)95% Coverage	0.216
KM SD of Logged Data	1.795	95% KM UPL (Lognormal)	0.0893
95% KM Percentile Lognormal (z)	0.077	95% KM USL (Lognormal)	0.555

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0233	Mean in Log Scale	-5.657
SD in Original Scale	0.0522	SD in Log Scale	1.975
95% UTL95% Coverage	0.28	95% UPL (t)	0.106
90% Percentile (z)	0.0439	95% Percentile (z)	0.09
99% Percentile (z)	0.346	95% USL	0.79

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.2
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.2
95% USL	0.2	95% KM Chebyshev UPL	0.25

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|fluoranthene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	28		
Number of Detects	26	Number of Non-Detects	4
Number of Distinct Detects	24	Number of Distinct Non-Detects	4
Minimum Detect	0.0012	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.57	Maximum Non-Detect	8.6000E-4
Variance Detected	0.0236	Percent Non-Detects	13.33%
Mean Detected	0.073	SD Detected	0.154
Mean of Detected Logged Data	-4.372	SD of Detected Logged Data	1.916

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.519	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.92	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.17	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0634	KM SD	0.142
95% UTL95% Coverage	0.38	95% KM UPL (t)	0.309
90% KM Percentile (z)	0.246	95% KM Percentile (z)	0.298
99% KM Percentile (z)	0.395	95% KM USL	0.454

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0634	SD	0.145
95% UTL95% Coverage	0.385	95% UPL (t)	0.314
90% Percentile (z)	0.249	95% Percentile (z)	0.302
99% Percentile (z)	0.4	95% USL	0.461

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.748	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.835	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.191	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.184	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.378	k star (bias corrected MLE)	0.36
Theta hat (MLE)	0.193	Theta star (bias corrected MLE)	0.203
nu hat (MLE)	19.67	nu star (bias corrected)	18.74
MLE Mean (bias corrected)	0.073		
MLE Sd (bias corrected)	0.122	95% Percentile of Chisquare (2kstar)	3.103

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	0.0646
Maximum	0.57	Median	0.01
SD	0.144	CV	2.233
k hat (MLE)	0.396	k star (bias corrected MLE)	0.379
Theta hat (MLE)	0.163	Theta star (bias corrected MLE)	0.171
nu hat (MLE)	23.77	nu star (bias corrected)	22.72
MLE Mean (bias corrected)	0.0646	MLE Sd (bias corrected)	0.105
95% Percentile of Chisquare (2kstar)	3.207	90% Percentile	0.184
95% Percentile	0.274	99% Percentile	0.5

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.366	0.385	95% Approx. Gamma UPL	0.237	0.233
95% Gamma USL	0.549	0.618			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0634	SD (KM)	0.142
Variance (KM)	0.0203	SE of Mean (KM)	0.0265
k hat (KM)	0.198	k star (KM)	0.201
nu hat (KM)	11.89	nu star (KM)	12.04
theta hat (KM)	0.32	theta star (KM)	0.316
80% gamma percentile (KM)	0.0837	90% gamma percentile (KM)	0.192
95% gamma percentile (KM)	0.326	99% gamma percentile (KM)	0.697

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.363	0.386	95% Approx. Gamma UPL	0.23	0.228
95% KM Gamma Percentile	0.212	0.207	95% Gamma USL	0.552	0.634

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0633	Mean in Log Scale	-4.948
SD in Original Scale	0.145	SD in Log Scale	2.324
95% UTL95% Coverage	1.235	95% BCA UTL95% Coverage	0.57
95% Bootstrap (%) UTL95% Coverage	0.57	95% UPL (t)	0.393
90% Percentile (z)	0.139	95% Percentile (z)	0.324
99% Percentile (z)	1.581	95% USL	4.184

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-4.754	95% KM UTL (Lognormal)95% Coverage	0.733
KM SD of Logged Data	2.002	95% KM UPL (Lognormal)	0.274
95% KM Percentile Lognormal (z)	0.232	95% KM USL (Lognormal)	2.098

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0634	Mean in Log Scale	-4.834
SD in Original Scale	0.145	SD in Log Scale	2.146
95% UTL95% Coverage	0.931	95% UPL (t)	0.324
90% Percentile (z)	0.124	95% Percentile (z)	0.271
99% Percentile (z)	1.17	95% USL	2.874

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.57

Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.554
95% USL	0.57	95% KM Chebyshev UPL	0.694

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|fluorene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	22		
Number of Detects	9	Number of Non-Detects	21
Number of Distinct Detects	9	Number of Distinct Non-Detects	14
Minimum Detect	8.6000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.03	Maximum Non-Detect	0.0079
Variance Detected	1.1906E-4	Percent Non-Detects	70%
Mean Detected	0.00885	SD Detected	0.0109
Mean of Detected Logged Data	-5.439	SD of Detected Logged Data	1.278

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.745	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00317	KM SD	0.00675
95% UTL95% Coverage	0.0182	95% KM UPL (t)	0.0148
90% KM Percentile (z)	0.0118	95% KM Percentile (z)	0.0143
99% KM Percentile (z)	0.0189	95% KM USL	0.0217

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00307	SD	0.00693
95% UTL95% Coverage	0.0185	95% UPL (t)	0.015
90% Percentile (z)	0.012	95% Percentile (z)	0.0145
99% Percentile (z)	0.0192	95% USL	0.0221

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.592	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.287	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.289	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.829	k star (bias corrected MLE)	0.627
Theta hat (MLE)	0.0107	Theta star (bias corrected MLE)	0.0141
nu hat (MLE)	14.93	nu star (bias corrected)	11.29
MLE Mean (bias corrected)	0.00885		
MLE Sd (bias corrected)	0.0112	95% Percentile of Chisquare (2kstar)	4.441

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	8.6000E-4	Mean	0.00966
Maximum	0.03	Median	0.01
SD	0.00576	CV	0.596
k hat (MLE)	2.477	k star (bias corrected MLE)	2.252
Theta hat (MLE)	0.0039	Theta star (bias corrected MLE)	0.00429
nu hat (MLE)	148.6	nu star (bias corrected)	135.1
MLE Mean (bias corrected)	0.00966	MLE Sd (bias corrected)	0.00643
95% Percentile of Chisquare (2kstar)	10.29	90% Percentile	0.0183
95% Percentile	0.0221	99% Percentile	0.0304

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0283	0.0304	95% Approx. Gamma UPL	0.0225	0.0236
95% Gamma USL	0.0354	0.0391			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00317	SD (KM)	0.00675
Variance (KM)	4.5590E-5	SE of Mean (KM)	0.00131
k hat (KM)	0.221	k star (KM)	0.221
nu hat (KM)	13.26	nu star (KM)	13.27
theta hat (KM)	0.0144	theta star (KM)	0.0144
80% gamma percentile (KM)	0.00439	90% gamma percentile (KM)	0.00959
95% gamma percentile (KM)	0.0159	99% gamma percentile (KM)	0.0331

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0145	0.014	95% Approx. Gamma UPL	0.00999	0.00938
95% KM Gamma Percentile	0.00935	0.00874	95% Gamma USL	0.0205	0.0207

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00273	Mean in Log Scale	-8.255
SD in Original Scale	0.00703	SD in Log Scale	2.099
95% UTL95% Coverage	0.0274	95% BCA UTL95% Coverage	0.03
95% Bootstrap (%) UTL95% Coverage	0.03	95% UPL (t)	0.00975
90% Percentile (z)	0.00383	95% Percentile (z)	0.00821
99% Percentile (z)	0.0343	95% USL	0.0826

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.686	95% KM UTL (Lognormal)95% Coverage	0.013
KM SD of Logged Data	1.056	95% KM UPL (Lognormal)	0.00773
95% KM Percentile Lognormal (z)	0.00708	95% KM USL (Lognormal)	0.0226

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00307	Mean in Log Scale	-7.017
SD in Original Scale	0.00693	SD in Log Scale	1.329
95% UTL95% Coverage	0.0171	95% UPL (t)	0.0089
90% Percentile (z)	0.00492	95% Percentile (z)	0.00798
99% Percentile (z)	0.0197	95% USL	0.0345

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.03
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0267
95% USL	0.03	95% KM Chebyshev UPL	0.0331

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|indeno(1,2,3-cd)pyrene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	24		
Number of Detects	15	Number of Non-Detects	15
Number of Distinct Detects	14	Number of Distinct Non-Detects	11
Minimum Detect	0.0012	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.36	Maximum Non-Detect	0.0025
Variance Detected	0.00853	Percent Non-Detects	50%
Mean Detected	0.0401	SD Detected	0.0924
Mean of Detected Logged Data	-4.681	SD of Detected Logged Data	1.634

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Shapiro Wilk Test Statistic	0.469	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0204	KM SD	0.0661
95% UTL95% Coverage	0.167	95% KM UPL (t)	0.135
90% KM Percentile (z)	0.105	95% KM Percentile (z)	0.129
99% KM Percentile (z)	0.174	95% KM USL	0.202

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0203	SD	0.0673
95% UTL95% Coverage	0.17	95% UPL (t)	0.136
90% Percentile (z)	0.106	95% Percentile (z)	0.131
99% Percentile (z)	0.177	95% USL	0.205

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.22	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.805	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.275	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.236	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.442	k star (bias corrected MLE)	0.398
Theta hat (MLE)	0.0906	Theta star (bias corrected MLE)	0.101
nu hat (MLE)	13.27	nu star (bias corrected)	11.95
MLE Mean (bias corrected)	0.0401		
MLE Sd (bias corrected)	0.0635	95% Percentile of Chisquare (2kstar)	3.315

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	0.025
Maximum	0.36	Median	0.01
SD	0.066	CV	2.635
k hat (MLE)	0.641	k star (bias corrected MLE)	0.599
Theta hat (MLE)	0.0391	Theta star (bias corrected MLE)	0.0418
nu hat (MLE)	38.43	nu star (bias corrected)	35.92
MLE Mean (bias corrected)	0.025	MLE Sd (bias corrected)	0.0324
95% Percentile of Chisquare (2kstar)	4.312	90% Percentile	0.0651
95% Percentile	0.0901	99% Percentile	0.151

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.114	0.111	95% Approx. Gamma UPL	0.0787	0.0739

95% Gamma USL	0.162	0.164

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0204	SD (KM)	0.0661
Variance (KM)	0.00437	SE of Mean (KM)	0.0125
k hat (KM)	0.0953	k star (KM)	0.108
nu hat (KM)	5.717	nu star (KM)	6.479
theta hat (KM)	0.214	theta star (KM)	0.189
80% gamma percentile (KM)	0.0157	90% gamma percentile (KM)	0.0559
95% gamma percentile (KM)	0.118	99% gamma percentile (KM)	0.312

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.104	0.1	95% Approx. Gamma UPL	0.0654	0.0592
95% KM Gamma Percentile	0.0601	0.0539	95% Gamma USL	0.159	0.164

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0201	Mean in Log Scale	-6.877
SD in Original Scale	0.0673	SD in Log Scale	2.553
95% UTL95% Coverage	0.298	95% BCA UTL95% Coverage	0.36
95% Bootstrap (%) UTL95% Coverage	0.36	95% UPL (t)	0.0848
90% Percentile (z)	0.0272	95% Percentile (z)	0.0687
99% Percentile (z)	0.391	95% USL	1.14

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.954	95% KM UTL (Lognormal)95% Coverage	0.112
KM SD of Logged Data	1.694	95% KM UPL (Lognormal)	0.0484
95% KM Percentile Lognormal (z)	0.0421	95% KM USL (Lognormal)	0.272

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0203	Mean in Log Scale	-6.23
SD in Original Scale	0.0673	SD in Log Scale	1.954
95% UTL95% Coverage	0.151	95% UPL (t)	0.0575
90% Percentile (z)	0.0241	95% Percentile (z)	0.049
99% Percentile (z)	0.185	95% USL	0.42

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.36
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.217

95% USL	0.36	95% KM Chebyshev UPL	0.313

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|naphthalene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	22		
Number of Detects	16	Number of Non-Detects	14
Number of Distinct Detects	15	Number of Distinct Non-Detects	9
Minimum Detect	7.4000E-4	Minimum Non-Detect	7.4000E-4
Maximum Detect	0.0057	Maximum Non-Detect	0.016
Variance Detected	2.4682E-6	Percent Non-Detects	46.67%
Mean Detected	0.00194	SD Detected	0.00157
Mean of Detected Logged Data	-6.492	SD of Detected Logged Data	0.687

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00148	KM SD	0.00131
95% UTL95% Coverage	0.00437	95% KM UPL (t)	0.00373
90% KM Percentile (z)	0.00315	95% KM Percentile (z)	0.00362
99% KM Percentile (z)	0.00451	95% KM USL	0.00506

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0018	SD	0.00189
95% UTL95% Coverage	0.006	95% UPL (t)	0.00507
90% Percentile (z)	0.00423	95% Percentile (z)	0.00491
99% Percentile (z)	0.0062	95% USL	0.007

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.328	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.288	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.218	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.169	k star (bias corrected MLE)	1.804
Theta hat (MLE)	8.9549E-4	Theta star (bias corrected MLE)	0.00108
nu hat (MLE)	69.41	nu star (bias corrected)	57.73
MLE Mean (bias corrected)	0.00194		
MLE Sd (bias corrected)	0.00145	95% Percentile of Chisquare (2kstar)	8.845

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.4000E-4	Mean	0.0057
Maximum	0.01	Median	0.00525
SD	0.00424	CV	0.744
k hat (MLE)	1.266	k star (bias corrected MLE)	1.161
Theta hat (MLE)	0.00451	Theta star (bias corrected MLE)	0.00491
nu hat (MLE)	75.94	nu star (bias corrected)	69.68
MLE Mean (bias corrected)	0.0057	MLE Sd (bias corrected)	0.00529
95% Percentile of Chisquare (2kstar)	6.602	90% Percentile	0.0127
95% Percentile	0.0162	99% Percentile	0.0244

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0226	0.025	95% Approx. Gamma UPL	0.0168	0.0179
95% Gamma USL	0.0301	0.0346			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00148	SD (KM)	0.00131
Variance (KM)	1.7048E-6	SE of Mean (KM)	2.6067E-4
k hat (KM)	1.278	k star (KM)	1.173
nu hat (KM)	76.7	nu star (KM)	70.36
theta hat (KM)	0.00115	theta star (KM)	0.00126
80% gamma percentile (KM)	0.00234	90% gamma percentile (KM)	0.00327
95% gamma percentile (KM)	0.00418	99% gamma percentile (KM)	0.00628

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0044	0.00443	95% Approx. Gamma UPL	0.00347	0.00344
95% KM Gamma Percentile	0.00333	0.00329	95% Gamma USL	0.00557	0.0057

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00129	Mean in Log Scale	-7.015
SD in Original Scale	0.00134	SD in Log Scale	0.827

95% UTL95% Coverage	0.00563	95% BCA UTL95% Coverage	0.0057
95% Bootstrap (%) UTL95% Coverage	0.0057	95% UPL (t)	0.00375
90% Percentile (z)	0.00259	95% Percentile (z)	0.0035
99% Percentile (z)	0.00615	95% USL	0.0087

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.761	95% KM UTL (Lognormal)95% Coverage	0.00455
KM SD of Logged Data	0.616	95% KM UPL (Lognormal)	0.00336
95% KM Percentile Lognormal (z)	0.00319	95% KM USL (Lognormal)	0.00628

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0018	Mean in Log Scale	-6.76
SD in Original Scale	0.00189	SD in Log Scale	0.932
95% UTL95% Coverage	0.00918	95% UPL (t)	0.0058
90% Percentile (z)	0.00383	95% Percentile (z)	0.00537
99% Percentile (z)	0.0101	95% USL	0.015

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.016
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0119
95% USL	0.016	95% KM Chebyshev UPL	0.00726

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|phenanthrene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	26		
Number of Detects	27	Number of Non-Detects	3
Number of Distinct Detects	23	Number of Distinct Non-Detects	3
Minimum Detect	9.6000E-4	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.31	Maximum Non-Detect	8.6000E-4
Variance Detected	0.00718	Percent Non-Detects	10%
Mean Detected	0.0407	SD Detected	0.0847
Mean of Detected Logged Data	-4.846	SD of Detected Logged Data	1.812

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.518	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Lilliefors Test Statistic	0.337	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.167	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0367	KM SD	0.0798
95% UTL95% Coverage	0.214	95% KM UPL (t)	0.175
90% KM Percentile (z)	0.139	95% KM Percentile (z)	0.168
99% KM Percentile (z)	0.222	95% KM USL	0.256

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0367	SD	0.0812
95% UTL95% Coverage	0.217	95% UPL (t)	0.177
90% Percentile (z)	0.141	95% Percentile (z)	0.17
99% Percentile (z)	0.225	95% USL	0.259

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.033	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.83	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.218	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.18	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.4	k star (bias corrected MLE)	0.38
Theta hat (MLE)	0.102	Theta star (bias corrected MLE)	0.107
nu hat (MLE)	21.59	nu star (bias corrected)	20.53
MLE Mean (bias corrected)	0.0407		
MLE Sd (bias corrected)	0.0661	95% Percentile of Chisquare (2kstar)	3.215

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.6000E-4	Mean	0.0377
Maximum	0.31	Median	0.0071
SD	0.0808	CV	2.144
k hat (MLE)	0.423	k star (bias corrected MLE)	0.403
Theta hat (MLE)	0.0891	Theta star (bias corrected MLE)	0.0936
nu hat (MLE)	25.36	nu star (bias corrected)	24.16
MLE Mean (bias corrected)	0.0377	MLE Sd (bias corrected)	0.0594
95% Percentile of Chisquare (2kstar)	3.338	90% Percentile	0.106
95% Percentile	0.156	99% Percentile	0.281

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.212	0.223	95% Approx. Gamma UPL	0.138	0.137
95% Gamma USL	0.315	0.355			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0367	SD (KM)	0.0798
Variance (KM)	0.00636	SE of Mean (KM)	0.0148
k hat (KM)	0.212	k star (KM)	0.213
nu hat (KM)	12.73	nu star (KM)	12.79
theta hat (KM)	0.173	theta star (KM)	0.172
80% gamma percentile (KM)	0.05	90% gamma percentile (KM)	0.111
95% gamma percentile (KM)	0.186	99% gamma percentile (KM)	0.391

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.207	0.218	95% Approx. Gamma UPL	0.133	0.131
95% KM Gamma Percentile	0.122	0.119	95% Gamma USL	0.311	0.353

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.923	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.167	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0367	Mean in Log Scale	-5.256
SD in Original Scale	0.0812	SD in Log Scale	2.124
95% UTL95% Coverage	0.582	95% BCA UTL95% Coverage	0.31
95% Bootstrap (%) UTL95% Coverage	0.31	95% UPL (t)	0.204
90% Percentile (z)	0.0793	95% Percentile (z)	0.172
99% Percentile (z)	0.729	95% USL	1.775

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.085	95% KM UTL (Lognormal)95% Coverage	0.362
KM SD of Logged Data	1.833	95% KM UPL (Lognormal)	0.147
95% KM Percentile Lognormal (z)	0.126	95% KM USL (Lognormal)	0.948

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0367	Mean in Log Scale	-5.145
SD in Original Scale	0.0812	SD in Log Scale	1.944
95% UTL95% Coverage	0.436	95% UPL (t)	0.167
90% Percentile (z)	0.0704	95% Percentile (z)	0.143
99% Percentile (z)	0.536	95% USL	1.21

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.31
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.31
95% USL	0.31	95% KM Chebyshev UPL	0.39

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|ss|pah|pyrene|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	27		
Number of Detects	26	Number of Non-Detects	4
Number of Distinct Detects	23	Number of Distinct Non-Detects	4
Minimum Detect	0.0012	Minimum Non-Detect	7.2000E-4
Maximum Detect	0.43	Maximum Non-Detect	8.6000E-4
Variance Detected	0.0135	Percent Non-Detects	13.33%
Mean Detected	0.0565	SD Detected	0.116
Mean of Detected Logged Data	-4.49	SD of Detected Logged Data	1.817

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.524	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.358	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0491	KM SD	0.108
95% UTL95% Coverage	0.289	95% KM UPL (t)	0.235
90% KM Percentile (z)	0.187	95% KM Percentile (z)	0.227
99% KM Percentile (z)	0.3	95% KM USL	0.345

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0491	SD	0.11
95% UTL95% Coverage	0.293	95% UPL (t)	0.239
90% Percentile (z)	0.19	95% Percentile (z)	0.23
99% Percentile (z)	0.304	95% USL	0.35

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.729	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.829	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.17	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.183	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.406	k star (bias corrected MLE)	0.385
Theta hat (MLE)	0.139	Theta star (bias corrected MLE)	0.147

nu hat (MLE)	21.11	nu star (bias corrected)	20.01
MLE Mean (bias corrected)	0.0565		
MLE Sd (bias corrected)	0.0912	95% Percentile of Chisquare (2kstar)	3.241

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	0.0503
Maximum	0.43	Median	0.01
SD	0.109	CV	2.17
k hat (MLE)	0.429	k star (bias corrected MLE)	0.408
Theta hat (MLE)	0.117	Theta star (bias corrected MLE)	0.123
nu hat (MLE)	25.75	nu star (bias corrected)	24.51
MLE Mean (bias corrected)	0.0503	MLE Sd (bias corrected)	0.0788
95% Percentile of Chisquare (2kstar)	3.37	90% Percentile	0.142
95% Percentile	0.208	99% Percentile	0.373

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.28	0.294	95% Approx. Gamma UPL	0.183	0.18
95% Gamma USL	0.416	0.466			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0491	SD (KM)	0.108
Variance (KM)	0.0116	SE of Mean (KM)	0.0201
k hat (KM)	0.207	k star (KM)	0.209
nu hat (KM)	12.42	nu star (KM)	12.51
theta hat (KM)	0.237	theta star (KM)	0.235
80% gamma percentile (KM)	0.0661	90% gamma percentile (KM)	0.148
95% gamma percentile (KM)	0.25	99% gamma percentile (KM)	0.528

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.278	0.295	95% Approx. Gamma UPL	0.178	0.176
95% KM Gamma Percentile	0.164	0.16	95% Gamma USL	0.419	0.478

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.049	Mean in Log Scale	-5.037
SD in Original Scale	0.11	SD in Log Scale	2.204
95% UTL95% Coverage	0.866	95% BCA UTL95% Coverage	0.43
95% Bootstrap (%) UTL95% Coverage	0.43	95% UPL (t)	0.292

90% Percentile (z)	0.109	95% Percentile (z)	0.244
99% Percentile (z)	1.095	95% USL	2.757

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-4.856	95% KM UTL (Lognormal)95% Coverage	0.532
KM SD of Logged Data	1.903	95% KM UPL (Lognormal)	0.208
95% KM Percentile Lognormal (z)	0.178	95% KM USL (Lognormal)	1.446

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0491	Mean in Log Scale	-4.937
SD in Original Scale	0.11	SD in Log Scale	2.047
95% UTL95% Coverage	0.675	95% UPL (t)	0.246
90% Percentile (z)	0.0989	95% Percentile (z)	0.208
99% Percentile (z)	0.839	95% USL	1.977

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.43
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.419
95% USL	0.43	95% KM Chebyshev UPL	0.527

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|aluminum|)

General Statistics

Total Number of Observations	62	Number of Distinct Observations	40
Minimum	2700	First Quartile	6100
Second Largest	29000	Median	9950
Maximum	31000	Third Quartile	15750
Mean	11602	SD	6442
Coefficient of Variation	0.555	Skewness	0.934
Mean of logged Data	9.199	SD of logged Data	0.593

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test

Shapiro Wilk Test Statistic	0.926	**Normal GOF Test**
5% Shapiro Wilk P Value	0.00109	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.114	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	24549	90% Percentile (z)	19857
95% UPL (t)	22448	95% Percentile (z)	22198
95% USL	31180	99% Percentile (z)	26588

Gamma GOF Test

A-D Test Statistic	0.251	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0762	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.286	k star (bias corrected MLE)	3.137
Theta hat (MLE)	3531	Theta star (bias corrected MLE)	3698
nu hat (MLE)	407.4	nu star (bias corrected)	389
MLE Mean (bias corrected)	11602	MLE Sd (bias corrected)	6550

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	24220	90% Percentile	20384
95% Hawkins Wixley (HW) Approx. Gamma UPL	24695	95% Percentile	24038
95% WH Approx. Gamma UTL with 95% Coverage	27822	99% Percentile	31939
95% HW Approx. Gamma UTL with 95% Coverage	28666		
95% WH USL	41492	95% HW USL	44381

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.166	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0923	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	32531	90% Percentile (z)	21129
95% UPL (t)	26813	95% Percentile (z)	26204
95% USL	59864	99% Percentile (z)	39241

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	61	95% UTL with 95% Coverage	29000
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
		Approximate Sample Size needed to achieve specified CC	93
95% Percentile Bootstrap UTL with 95% Coverage	29000	95% BCA Bootstrap UTL with 95% Coverage	28900
95% UPL	26250	90% Percentile	19000
90% Chebyshev UPL	31083	95% Percentile	21950
95% Chebyshev UPL	39907	99% Percentile	29780
95% USL	31000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers

and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|arsenic|ml|)

General Statistics

Total Number of Observations	31	Number of Missing Observations	0
Number of Distinct Observations	24		
Number of Detects	30	Number of Non-Detects	1
Number of Distinct Detects	23	Number of Distinct Non-Detects	1
Minimum Detect	0.74	Minimum Non-Detect	0.56
Maximum Detect	5	Maximum Non-Detect	0.56
Variance Detected	1.356	Percent Non-Detects	3.226%
Mean Detected	2.537	SD Detected	1.164
Mean of Detected Logged Data	0.814	SD of Detected Logged Data	0.517

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.197	d2max (for USL)	2.76

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.474	KM SD	1.179
95% UTL95% Coverage	5.064	95% KM UPL (t)	4.507
90% KM Percentile (z)	3.985	95% KM Percentile (z)	4.413
99% KM Percentile (z)	5.216	95% KM USL	5.727

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.465	SD	1.214
95% UTL95% Coverage	5.133	95% UPL (t)	4.559
90% Percentile (z)	4.021	95% Percentile (z)	4.462
99% Percentile (z)	5.29	95% USL	5.816

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.426	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.115	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.161	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.416	k star (bias corrected MLE)	3.997
Theta hat (MLE)	0.575	Theta star (bias corrected MLE)	0.635
nu hat (MLE)	265	nu star (bias corrected)	239.8
MLE Mean (bias corrected)	2.537		

MLE Sd (bias corrected)	1.269	95% Percentile of Chisquare (2kstar)	15.5

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.476	Mean	2.471
Maximum	5	Median	2.4
SD	1.203	CV	0.487
k hat (MLE)	3.702	k star (bias corrected MLE)	3.365
Theta hat (MLE)	0.667	Theta star (bias corrected MLE)	0.734
nu hat (MLE)	229.5	nu star (bias corrected)	208.6
MLE Mean (bias corrected)	2.471	MLE Sd (bias corrected)	1.347
95% Percentile of Chisquare (2kstar)	13.67	90% Percentile	4.277
95% Percentile	5.02	99% Percentile	6.62

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	6.178	6.44	95% Approx. Gamma UPL	5.11	5.244
95% Gamma USL	7.63	8.118			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.474	SD (KM)	1.179
Variance (KM)	1.39	SE of Mean (KM)	0.215
k hat (KM)	4.401	k star (KM)	3.997
nu hat (KM)	272.9	nu star (KM)	247.8
theta hat (KM)	0.562	theta star (KM)	0.619
80% gamma percentile (KM)	3.411	90% gamma percentile (KM)	4.132
95% gamma percentile (KM)	4.796	99% gamma percentile (KM)	6.214

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	6.039	6.273	95% Approx. Gamma UPL	5.017	5.135
95% KM Gamma Percentile	4.857	4.959	95% Gamma USL	7.425	7.863

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.476	Mean in Log Scale	0.772
SD in Original Scale	1.195	SD in Log Scale	0.558
95% UTL95% Coverage	7.378	95% BCA UTL95% Coverage	5
95% Bootstrap (%) UTL95% Coverage	5	95% UPL (t)	5.667
90% Percentile (z)	4.426	95% Percentile (z)	5.421
99% Percentile (z)	7.93	95% USL	10.1

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.769	95% KM UTL (Lognormal)95% Coverage	7.339
KM SD of Logged Data	0.557	95% KM UPL (Lognormal)	5.639
95% KM Percentile Lognormal (z)	5.395	95% KM USL (Lognormal)	10.04

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.465	Mean in Log Scale	0.746
SD in Original Scale	1.214	SD in Log Scale	0.631
95% UTL95% Coverage	8.446	95% UPL (t)	6.267
90% Percentile (z)	4.738	95% Percentile (z)	5.96
99% Percentile (z)	9.165	95% USL	12.05

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	31	95% UTL with95% Coverage	5
Approx, f used to compute achieved CC	1.632	Approximate Actual Confidence Coefficient achieved by UTL	0.796
Approximate Sample Size needed to achieve specified CC	59	95% UPL	4.76
95% USL	5	95% KM Chebyshev UPL	7.695

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|arsenic|wsl|)

General Statistics

Total Number of Observations	31	Number of Missing Observations	0
Number of Distinct Observations	23		
Number of Detects	29	Number of Non-Detects	2
Number of Distinct Detects	21	Number of Distinct Non-Detects	2
Minimum Detect	0.75	Minimum Non-Detect	0.56
Maximum Detect	3	Maximum Non-Detect	0.57
Variance Detected	0.462	Percent Non-Detects	6.452%
Mean Detected	1.88	SD Detected	0.68
Mean of Detected Logged Data	0.557	SD of Detected Logged Data	0.411

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.197	d2max (for USL)	2.76

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.795	KM SD	0.723
95% UTL95% Coverage	3.383	95% KM UPL (t)	3.042
90% KM Percentile (z)	2.721	95% KM Percentile (z)	2.984
99% KM Percentile (z)	3.477	95% KM USL	3.79

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	1.777	SD	0.769
95% UTL95% Coverage	3.465	95% UPL (t)	3.102
90% Percentile (z)	2.762	95% Percentile (z)	3.041
99% Percentile (z)	3.565	95% USL	3.898

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.669	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.132	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.163	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	6.875	k star (bias corrected MLE)	6.187
Theta hat (MLE)	0.273	Theta star (bias corrected MLE)	0.304
nu hat (MLE)	398.8	nu star (bias corrected)	358.8
MLE Mean (bias corrected)	1.88		
MLE Sd (bias corrected)	0.756	95% Percentile of Chisquare (2kstar)	21.53

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.652	Mean	1.801
Maximum	3	Median	1.9
SD	0.725	CV	0.403
k hat (MLE)	5.429	k star (bias corrected MLE)	4.925
Theta hat (MLE)	0.332	Theta star (bias corrected MLE)	0.366
nu hat (MLE)	336.6	nu star (bias corrected)	305.4
MLE Mean (bias corrected)	1.801	MLE Sd (bias corrected)	0.811
95% Percentile of Chisquare (2kstar)	18.1	90% Percentile	2.887
95% Percentile	3.309	99% Percentile	4.201

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.953	4.073	95% Approx. Gamma UPL	3.358	3.42
95% Gamma USL	4.748	4.966			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.795	SD (KM)	0.723
Variance (KM)	0.523	SE of Mean (KM)	0.132
k hat (KM)	6.161	k star (KM)	5.586

ProUCL Output - Background Threshold Values (with NDs)

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nu hat (KM)	382	nu star (KM)	346.3
theta hat (KM)	0.291	theta star (KM)	0.321
80% gamma percentile (KM)	2.383	90% gamma percentile (KM)	2.81
95% gamma percentile (KM)	3.198	99% gamma percentile (KM)	4.013

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.974	4.104	95% Approx. Gamma UPL	3.369	3.437
95% KM Gamma Percentile	3.273	3.333	95% Gamma USL	4.784	5.019

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	1.803	Mean in Log Scale	0.496
SD in Original Scale	0.722	SD in Log Scale	0.462
95% UTL95% Coverage	4.528	95% BCA UTL95% Coverage	3
95% Bootstrap (%) UTL95% Coverage	3	95% UPL (t)	3.64
90% Percentile (z)	2.967	95% Percentile (z)	3.509
99% Percentile (z)	4.806	95% USL	5.87

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.483	95% KM UTL (Lognormal)95% Coverage	4.66
KM SD of Logged Data	0.48	95% KM UPL (Lognormal)	3.713
95% KM Percentile Lognormal (z)	3.574	95% KM USL (Lognormal)	6.106

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	1.777	Mean in Log Scale	0.439
SD in Original Scale	0.769	SD in Log Scale	0.604
95% UTL95% Coverage	5.848	95% UPL (t)	4.396
90% Percentile (z)	3.364	95% Percentile (z)	4.19
99% Percentile (z)	6.323	95% USL	8.214

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	31	95% UTL with95% Coverage	3
Approx, f used to compute achieved CC	1.632	Approximate Actual Confidence Coefficient achieved by UTL	0.796
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3
95% USL	3	95% KM Chebyshev UPL	4.997

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data

ProUCL Output - Background Threshold Values (with NDs)
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represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|beryllium|)

General Statistics

Total Number of Observations	62	Number of Missing Observations	0
Number of Distinct Observations	45		
Number of Detects	57	Number of Non-Detects	5
Number of Distinct Detects	40	Number of Distinct Non-Detects	5
Minimum Detect	0.023	Minimum Non-Detect	0.0092
Maximum Detect	4.9	Maximum Non-Detect	0.011
Variance Detected	0.408	Percent Non-Detects	8.065%
Mean Detected	0.22	SD Detected	0.639
Mean of Detected Logged Data	-2.166	SD of Detected Logged Data	0.873

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.24	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.405	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.117	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.203	KM SD	0.61
95% UTL95% Coverage	1.429	95% KM UPL (t)	1.23
90% KM Percentile (z)	0.985	95% KM Percentile (z)	1.207
99% KM Percentile (z)	1.623	95% KM USL	2.057

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.203	SD	0.615
95% UTL95% Coverage	1.439	95% UPL (t)	1.239
90% Percentile (z)	0.991	95% Percentile (z)	1.215
99% Percentile (z)	1.634	95% USL	2.073

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.594	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.785	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.122	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.895	k star (bias corrected MLE)	0.86
Theta hat (MLE)	0.246	Theta star (bias corrected MLE)	0.256
nu hat (MLE)	102.1	nu star (bias corrected)	98.02
MLE Mean (bias corrected)	0.22		
MLE Sd (bias corrected)	0.238	95% Percentile of Chisquare (2kstar)	5.436

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.203
Maximum	4.9	Median	0.1
SD	0.615	CV	3.025
k hat (MLE)	0.774	k star (bias corrected MLE)	0.747
Theta hat (MLE)	0.263	Theta star (bias corrected MLE)	0.272
nu hat (MLE)	95.99	nu star (bias corrected)	92.68
MLE Mean (bias corrected)	0.203	MLE Sd (bias corrected)	0.235
95% Percentile of Chisquare (2kstar)	4.969	90% Percentile	0.503
95% Percentile	0.676	99% Percentile	1.088

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.727	0.705	95% Approx. Gamma UPL	0.576	0.549
95% Gamma USL	1.372	1.418			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.203	SD (KM)	0.61
Variance (KM)	0.372	SE of Mean (KM)	0.0782
k hat (KM)	0.111	k star (KM)	0.116
nu hat (KM)	13.77	nu star (KM)	14.43
theta hat (KM)	1.831	theta star (KM)	1.746
80% gamma percentile (KM)	0.172	90% gamma percentile (KM)	0.571
95% gamma percentile (KM)	1.164	99% gamma percentile (KM)	2.989

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.721	0.7	95% Approx. Gamma UPL	0.572	0.545
95% KM Gamma Percentile	0.556	0.529	95% Gamma USL	1.358	1.406

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.921	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.00105	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.104	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.117	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.204	Mean in Log Scale	-2.319
SD in Original Scale	0.615	SD in Log Scale	0.986
95% UTL95% Coverage	0.713	95% BCA UTL95% Coverage	0.615
95% Bootstrap (%) UTL95% Coverage	0.615	95% UPL (t)	0.517
90% Percentile (z)	0.348	95% Percentile (z)	0.498
99% Percentile (z)	0.974	95% USL	1.966

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.37	95% KM UTL (Lognormal)95% Coverage	0.815
KM SD of Logged Data	1.077	95% KM UPL (Lognormal)	0.574
95% KM Percentile Lognormal (z)	0.55	95% KM USL (Lognormal)	2.472

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.203	Mean in Log Scale	-2.42
SD in Original Scale	0.615	SD in Log Scale	1.203
95% UTL95% Coverage	0.998	95% UPL (t)	0.674
90% Percentile (z)	0.415	95% Percentile (z)	0.643
99% Percentile (z)	1.46	95% USL	3.44

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	61	95% UTL with95% Coverage	0.63
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
Approximate Sample Size needed to achieve specified CC	93	95% UPL	0.334
95% USL	4.9	95% KM Chebyshev UPL	2.884

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|chromium|)

General Statistics

Total Number of Observations	62	Number of Distinct Observations	40
Minimum	3.2	First Quartile	8.35
Second Largest	40	Median	11
Maximum	41	Third Quartile	17.75
Mean	14.23	SD	8.563
Coefficient of Variation	0.602	Skewness	1.532
Mean of logged Data	2.498	SD of logged Data	0.568

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test

Shapiro Wilk Test Statistic	0.85	**Normal GOF Test**
5% Shapiro Wilk P Value	2.7579E-8	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	31.44	90% Percentile (z)	25.21
95% UPL (t)	28.65	95% Percentile (z)	28.32
95% USL	40.26	99% Percentile (z)	34.15

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Gamma GOF Test

A-D Test Statistic	0.575	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.12	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.114	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.321	k star (bias corrected MLE)	3.171
Theta hat (MLE)	4.286	Theta star (bias corrected MLE)	4.489
nu hat (MLE)	411.8	nu star (bias corrected)	393.2
MLE Mean (bias corrected)	14.23	MLE Sd (bias corrected)	7.993

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	29.54	90% Percentile	24.95
95% Hawkins Wixley (HW) Approx. Gamma UPL	29.9	95% Percentile	29.4
95% WH Approx. Gamma UTL with 95% Coverage	33.92	99% Percentile	39.02
95% HW Approx. Gamma UTL with 95% Coverage	34.65		
95% WH USL	50.51	95% HW USL	53.38

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.537	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0858	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	38.07	90% Percentile (z)	25.17
95% UPL (t)	31.63	95% Percentile (z)	30.94
95% USL	68.32	99% Percentile (z)	45.57

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	61	95% UTL with 95% Coverage	40
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
		Approximate Sample Size needed to achieve specified CC	93
95% Percentile Bootstrap UTL with 95% Coverage	39.9	95% BCA Bootstrap UTL with 95% Coverage	39.9
95% UPL	37.7	90% Percentile	22.8
90% Chebyshev UPL	40.13	95% Percentile	35.7
95% Chebyshev UPL	51.86	99% Percentile	40.39
95% USL	41		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

ConcAveWithMaxDectForD_ND_MDL (|all|metals|copper|)

General Statistics

Total Number of Observations	62	Number of Distinct Observations	34
Minimum	5.4	First Quartile	16.25
Second Largest	72	Median	27.5
Maximum	76	Third Quartile	34
Mean	27.48	SD	14.78
Coefficient of Variation	0.538	Skewness	1.321
Mean of logged Data	3.177	SD of logged Data	0.537

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test

Shapiro Wilk Test Statistic	0.882	**Normal GOF Test**
5% Shapiro Wilk P Value	2.1946E-6	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.109	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	57.2	90% Percentile (z)	46.43
95% UPL (t)	52.37	95% Percentile (z)	51.8
95% USL	72.41	99% Percentile (z)	61.87

Gamma GOF Test

A-D Test Statistic	0.697	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0944	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.823	k star (bias corrected MLE)	3.648
Theta hat (MLE)	7.19	Theta star (bias corrected MLE)	7.533
nu hat (MLE)	474	nu star (bias corrected)	452.4
MLE Mean (bias corrected)	27.48	MLE Sd (bias corrected)	14.39

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	54.93	90% Percentile	46.78
95% Hawkins Wixley (HW) Approx. Gamma UPL	55.71	95% Percentile	54.61
95% WH Approx. Gamma UTL with 95% Coverage	62.59	99% Percentile	71.41
95% HW Approx. Gamma UTL with 95% Coverage	64.04		
95% WH USL	91.35	95% HW USL	96.51

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.261	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	70.6	90% Percentile (z)	47.74
95% UPL (t)	59.25	95% Percentile (z)	58.03
95% USL	122.7	99% Percentile (z)	83.69

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	61	95% UTL with 95% Coverage	72
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
		Approximate Sample Size needed to achieve specified CC	93
95% Percentile Bootstrap UTL with 95% Coverage	71.65	95% BCA Bootstrap UTL with 95% Coverage	72
95% UPL	64.85	90% Percentile	40
90% Chebyshev UPL	72.19	95% Percentile	62.9
95% Chebyshev UPL	92.44	99% Percentile	73.56
95% USL	76		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|iron (fe)|ml|)

General Statistics

Total Number of Observations	31	Number of Distinct Observations	25
Minimum	4400	First Quartile	8050
Second Largest	36000	Median	13000
Maximum	38000	Third Quartile	17500
Mean	14439	SD	8756
Coefficient of Variation	0.606	Skewness	1.308
Mean of logged Data	9.414	SD of logged Data	0.583

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.197	d2max (for USL)	2.76

Normal GOF Test

Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	33676	90% Percentile (z)	25660
95% UPL (t)	29538	95% Percentile (z)	28841
95% USL	38601	99% Percentile (z)	34808

Gamma GOF Test

A-D Test Statistic	0.397	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0924	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.159	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.211	k star (bias corrected MLE)	2.922
Theta hat (MLE)	4497	Theta star (bias corrected MLE)	4942
nu hat (MLE)	199.1	nu star (bias corrected)	181.1
MLE Mean (bias corrected)	14439	MLE Sd (bias corrected)	8447

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	31025	90% Percentile	25764
95% Hawkins Wixley (HW) Approx. Gamma UPL	31472	95% Percentile	30533
95% WH Approx. Gamma UTL with 95% Coverage	37927	99% Percentile	40885
95% HW Approx. Gamma UTL with 95% Coverage	39036		
95% WH USL	47390	95% HW USL	49726

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.929	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.121	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.156	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	44117	90% Percentile (z)	25873
95% UPL (t)	33493	95% Percentile (z)	31975
95% USL	61234	99% Percentile (z)	47570

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	31	95% UTL with 95% Coverage	38000
Approx, f used to compute achieved CC	1.632	Approximate Actual Confidence Coefficient achieved by UTL	0.796
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	38000	95% BCA Bootstrap UTL with 95% Coverage	38000
95% UPL	36800	90% Percentile	29000
90% Chebyshev UPL	41127	95% Percentile	33000
95% Chebyshev UPL	53215	99% Percentile	37400
95% USL	38000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|iron (fe)|wsl|)

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

General Statistics

Total Number of Observations	31	Number of Distinct Observations	21
Minimum	1900	First Quartile	5400
Second Largest	18000	Median	11000
Maximum	19000	Third Quartile	14000
Mean	9923	SD	5237
Coefficient of Variation	0.528	Skewness	0.193
Mean of logged Data	9.041	SD of logged Data	0.611

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.197	d2max (for USL)	2.76

Normal GOF Test

Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	21430	90% Percentile (z)	16635
95% UPL (t)	18954	95% Percentile (z)	18537
95% USL	24375	99% Percentile (z)	22107

Gamma GOF Test

A-D Test Statistic	1.144	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.159	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.248	k star (bias corrected MLE)	2.955
Theta hat (MLE)	3055	Theta star (bias corrected MLE)	3358
nu hat (MLE)	201.4	nu star (bias corrected)	183.2
MLE Mean (bias corrected)	9923	MLE Sd (bias corrected)	5772

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	21332	90% Percentile	17662
95% Hawkins Wixley (HW) Approx. Gamma UPL	21869	95% Percentile	20914
95% WH Approx. Gamma UTL with 95% Coverage	26053	99% Percentile	27970
95% HW Approx. Gamma UTL with 95% Coverage	27160		
95% WH USL	32522	95% HW USL	34645

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.156	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	32285	90% Percentile (z)	18459
95% UPL (t)	24191	95% Percentile (z)	23044
95% USL	45516	99% Percentile (z)	34937

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	31	95% UTL with 95% Coverage	19000
Approx, f used to compute achieved CC	1.632	Approximate Actual Confidence Coefficient achieved by UTL	0.796
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	19000	95% BCA Bootstrap UTL with 95% Coverage	18500
95% UPL	18400	90% Percentile	17000
90% Chebyshev UPL	25886	95% Percentile	17500
95% Chebyshev UPL	33117	99% Percentile	18700
95% USL	19000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|nickel|)

General Statistics

Total Number of Observations	62	Number of Distinct Observations	46
Minimum	1.6	First Quartile	4.025
Second Largest	23	Median	6.3
Maximum	25	Third Quartile	8.8
Mean	7.318	SD	4.845
Coefficient of Variation	0.662	Skewness	1.806
Mean of logged Data	1.809	SD of logged Data	0.602

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test

Shapiro Wilk Test Statistic	0.83	**Normal GOF Test**
5% Shapiro Wilk P Value	1.8284E-9	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	17.06	90% Percentile (z)	13.53
95% UPL (t)	15.48	95% Percentile (z)	15.29
95% USL	22.04	99% Percentile (z)	18.59

Gamma GOF Test

A-D Test Statistic	0.6	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.1	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.915	k star (bias corrected MLE)	2.785
Theta hat (MLE)	2.51	Theta star (bias corrected MLE)	2.628
nu hat (MLE)	361.5	nu star (bias corrected)	345.3
MLE Mean (bias corrected)	7.318	MLE Sd (bias corrected)	4.385

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	15.75	90% Percentile	13.2
95% Hawkins Wixley (HW) Approx. Gamma UPL	15.93	95% Percentile	15.69
95% WH Approx. Gamma UTL with 95% Coverage	18.21	99% Percentile	21.12
95% HW Approx. Gamma UTL with 95% Coverage	18.6		
95% WH USL	27.65	95% HW USL	29.29

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.981	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0.7	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0746	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	20.47	90% Percentile (z)	13.2
95% UPL (t)	16.82	95% Percentile (z)	16.43
95% USL	38.04	99% Percentile (z)	24.77

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	61	95% UTL with 95% Coverage	23
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
		Approximate Sample Size needed to achieve specified CC	93
95% Percentile Bootstrap UTL with 95% Coverage	23	95% BCA Bootstrap UTL with 95% Coverage	22.9
95% UPL	20.4	90% Percentile	12
90% Chebyshev UPL	21.97	95% Percentile	16.85
95% Chebyshev UPL	28.61	99% Percentile	23.78
95% USL	25		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|vanadium|)

General Statistics

Total Number of Observations	62	Number of Distinct Observations	36

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Minimum	4.1	First Quartile	12.25
Second Largest	59	Median	18
Maximum	60	Third Quartile	24
Mean	19.93	SD	11.82
Coefficient of Variation	0.593	Skewness	1.869
Mean of logged Data	2.846	SD of logged Data	0.544

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test

Shapiro Wilk Test Statistic	0.809	**Normal GOF Test**
5% Shapiro Wilk P Value	1.277E-10	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	43.68	90% Percentile (z)	35.08
95% UPL (t)	39.83	95% Percentile (z)	39.37
95% USL	55.85	99% Percentile (z)	47.43

Gamma GOF Test

A-D Test Statistic	0.829	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.105	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.577	k star (bias corrected MLE)	3.415
Theta hat (MLE)	5.571	Theta star (bias corrected MLE)	5.836
nu hat (MLE)	443.6	nu star (bias corrected)	423.4
MLE Mean (bias corrected)	19.93	MLE Sd (bias corrected)	10.78

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	40.48	90% Percentile	34.39
95% Hawkins Wixley (HW) Approx. Gamma UPL	40.9	95% Percentile	40.32
95% WH Approx. Gamma UTL with 95% Coverage	46.28	99% Percentile	53.1
95% HW Approx. Gamma UTL with 95% Coverage	47.17		
95% WH USL	68.16	95% HW USL	71.71

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.275	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0913	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.112	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	51.4	90% Percentile (z)	34.58
95% UPL (t)	43.04	95% Percentile (z)	42.14

95% USL	90	99% Percentile (z)	61.06

Nonparametric Distribution Free Background Statistics

Data appear Approximate Gamma Distribution at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	61	95% UTL with 95% Coverage	59
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
		Approximate Sample Size needed to achieve specified CC	93
95% Percentile Bootstrap UTL with 95% Coverage	59	95% BCA Bootstrap UTL with 95% Coverage	58.85
95% UPL	55.4	90% Percentile	27.9
90% Chebyshev UPL	55.67	95% Percentile	50.9
95% Chebyshev UPL	71.86	99% Percentile	59.39
95% USL	60		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|zinc|)

General Statistics

Total Number of Observations	62	Number of Missing Observations	0
Number of Distinct Observations	36		
Number of Detects	61	Number of Non-Detects	1
Number of Distinct Detects	35	Number of Distinct Non-Detects	1
Minimum Detect	3	Minimum Non-Detect	0.27
Maximum Detect	50	Maximum Non-Detect	0.27
Variance Detected	96.26	Percent Non-Detects	1.613%
Mean Detected	16.83	SD Detected	9.811
Mean of Detected Logged Data	2.666	SD of Detected Logged Data	0.577

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.01	d2max (for USL)	3.039

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.881	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	2.5825E-6	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.113	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	16.56	KM SD	9.874
95% UTL95% Coverage	36.4	95% KM UPL (t)	33.18
90% KM Percentile (z)	29.21	95% KM Percentile (z)	32.8
99% KM Percentile (z)	39.53	95% KM USL	46.57

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	16.56	SD	9.959

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

95% UTL95% Coverage	36.57	95% UPL (t)	33.32
90% Percentile (z)	29.32	95% Percentile (z)	32.94
99% Percentile (z)	39.72	95% USL	46.82

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.358	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0723	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.115	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.336	k star (bias corrected MLE)	3.183
Theta hat (MLE)	5.044	Theta star (bias corrected MLE)	5.287
nu hat (MLE)	406.9	nu star (bias corrected)	388.3
MLE Mean (bias corrected)	16.83		
MLE Sd (bias corrected)	9.431	95% Percentile of Chisquare (2kstar)	13.13

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.686	Mean	16.57
Maximum	50	Median	14
SD	9.944	CV	0.6
k hat (MLE)	2.776	k star (bias corrected MLE)	2.652
Theta hat (MLE)	5.968	Theta star (bias corrected MLE)	6.246
nu hat (MLE)	344.2	nu star (bias corrected)	328.9
MLE Mean (bias corrected)	16.57	MLE Sd (bias corrected)	10.17
95% Percentile of Chisquare (2kstar)	11.54	90% Percentile	30.2
95% Percentile	36.04	99% Percentile	48.78

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	41.88	43.73	95% Approx. Gamma UPL	36.16	37.26
95% Gamma USL	63.84	69.75			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	16.56	SD (KM)	9.874
Variance (KM)	97.5	SE of Mean (KM)	1.264
k hat (KM)	2.812	k star (KM)	2.687
nu hat (KM)	348.7	nu star (KM)	333.2
theta hat (KM)	5.888	theta star (KM)	6.163
80% gamma percentile (KM)	23.93	90% gamma percentile (KM)	30.1
95% gamma percentile (KM)	35.88	99% gamma percentile (KM)	48.5

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW

95% Approx. Gamma UTL with 95% Coverage	42.36	44.7	95% Approx. Gamma UPL	36.5	37.95
95% KM Gamma Percentile	35.84	37.2	95% Gamma USL	64.89	71.99

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.983	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.773	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0734	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.113	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	16.6	Mean in Log Scale	2.641
SD in Original Scale	9.884	SD in Log Scale	0.604
95% UTL95% Coverage	47.2	95% BCA UTL95% Coverage	44.85
95% Bootstrap (%) UTL95% Coverage	45	95% UPL (t)	38.76
90% Percentile (z)	30.41	95% Percentile (z)	37.86
99% Percentile (z)	57.14	95% USL	87.86

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	2.601	95% KM UTL (Lognormal)95% Coverage	61.7
KM SD of Logged Data	0.757	95% KM UPL (Lognormal)	48.2
95% KM Percentile Lognormal (z)	46.81	95% KM USL (Lognormal)	134.4

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	16.56	Mean in Log Scale	2.59
SD in Original Scale	9.959	SD in Log Scale	0.824
95% UTL95% Coverage	69.82	95% UPL (t)	53.37
90% Percentile (z)	38.32	95% Percentile (z)	51.69
99% Percentile (z)	90.62	95% USL	163

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	61	95% UTL with95% Coverage	45
Approx, f used to compute achieved CC	1.605	Approximate Actual Confidence Coefficient achieved by UTL	0.823
Approximate Sample Size needed to achieve specified CC	93	95% UPL	41.55
95% USL	50	95% KM Chebyshev UPL	59.95

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|calcium (ca)|ml|)

General Statistics

Total Number of Observations	31	Number of Distinct Observations	26
Minimum	230	First Quartile	350
Second Largest	1700	Median	490

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Maximum	2500	Third Quartile	607.5
Mean	638.1	SD	489.1
Coefficient of Variation	0.767	Skewness	2.433
Mean of logged Data	6.273	SD of logged Data	0.569

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.197	d2max (for USL)	2.76

Normal GOF Test

Shapiro Wilk Test Statistic	0.703	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.321	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1713	90% Percentile (z)	1265
95% UPL (t)	1482	95% Percentile (z)	1443
95% USL	1988	99% Percentile (z)	1776

Gamma GOF Test

A-D Test Statistic	1.671	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.246	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.159	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.845	k star (bias corrected MLE)	2.591
Theta hat (MLE)	224.3	Theta star (bias corrected MLE)	246.2
nu hat (MLE)	176.4	nu star (bias corrected)	160.7
MLE Mean (bias corrected)	638.1	MLE Sd (bias corrected)	396.4

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1410	90% Percentile	1169
95% Hawkins Wixley (HW) Approx. Gamma UPL	1408	95% Percentile	1398
95% WH Approx. Gamma UTL with 95% Coverage	1740	99% Percentile	1897
95% HW Approx. Gamma UTL with 95% Coverage	1759		
95% WH USL	2196	95% HW USL	2257

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.156	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	1851	90% Percentile (z)	1099
95% UPL (t)	1414	95% Percentile (z)	1352
95% USL	2550	99% Percentile (z)	1993

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	31	95% UTL with 95% Coverage	2500
Approx, f used to compute achieved CC	1.632	Approximate Actual Confidence Coefficient achieved by UTL	0.796
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	2500	95% BCA Bootstrap UTL with 95% Coverage	2500
95% UPL	2020	90% Percentile	1200
90% Chebyshev UPL	2129	95% Percentile	1550
95% Chebyshev UPL	2804	99% Percentile	2260
95% USL	2500		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcAveWithMaxDectForD_ND_MDL (|all|metals|calcium (ca)|wsl|)

General Statistics

Total Number of Observations	31	Number of Distinct Observations	25
Minimum	170	First Quartile	270
Second Largest	730	Median	380
Maximum	960	Third Quartile	460
Mean	390.8	SD	164.3
Coefficient of Variation	0.42	Skewness	1.59
Mean of logged Data	5.895	SD of logged Data	0.382

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.197	d2max (for USL)	2.76

Normal GOF Test

Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	751.8	90% Percentile (z)	601.4
95% UPL (t)	674.1	95% Percentile (z)	661.1
95% USL	844.2	99% Percentile (z)	773

Gamma GOF Test

A-D Test Statistic	0.418	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.11	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.158	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.946	k star (bias corrected MLE)	6.295
Theta hat (MLE)	56.26	Theta star (bias corrected MLE)	62.08
nu hat (MLE)	430.6	nu star (bias corrected)	390.3
MLE Mean (bias corrected)	390.8	MLE Sd (bias corrected)	155.8

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	684	90% Percentile	599
95% Hawkins Wixley (HW) Approx. Gamma UPL	687.4	95% Percentile	677.2
95% WH Approx. Gamma UTL with 95% Coverage	792.8	99% Percentile	840.8
95% HW Approx. Gamma UTL with 95% Coverage	802.3		
95% WH USL	936.5	95% HW USL	957.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.929	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.095	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.156	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	840.8	90% Percentile (z)	592.5
95% UPL (t)	701.8	95% Percentile (z)	680.8
95% USL	1042	99% Percentile (z)	883.4

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	31	95% UTL with 95% Coverage	960
Approx, f used to compute achieved CC	1.632	Approximate Actual Confidence Coefficient achieved by UTL	0.796
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	960	95% BCA Bootstrap UTL with 95% Coverage	845
95% UPL	822	90% Percentile	540
90% Chebyshev UPL	891.6	95% Percentile	635
95% Chebyshev UPL	1118	99% Percentile	891
95% USL	960		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcKM, Capped (|sb|pah|bapeq|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	19		
Number of Detects	3	Number of Non-Detects	29
Number of Distinct Detects	3	Number of Distinct Non-Detects	16
Minimum Detect	0.00125	Minimum Non-Detect	0.00159
Maximum Detect	0.00517	Maximum Non-Detect	0.0019

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Variance Detected	4.0011E-6	Percent Non-Detects	90.63%
Mean Detected	0.00297	SD Detected	0.002
Mean of Detected Logged Data	-5.98	SD of Detected Logged Data	0.71

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00141	KM SD	7.0945E-4
95% UTL95% Coverage	0.00296	95% KM UPL (t)	0.00263
90% KM Percentile (z)	0.00232	95% KM Percentile (z)	0.00258
99% KM Percentile (z)	0.00306	95% KM USL	0.00338

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00107	SD	8.0395E-4
95% UTL95% Coverage	0.00283	95% UPL (t)	0.00246
90% Percentile (z)	0.0021	95% Percentile (z)	0.00239
99% Percentile (z)	0.00294	95% USL	0.0033

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.239	k star (bias corrected MLE)	N/A
Theta hat (MLE)	9.1827E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	19.43	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00125	Mean	0.00934
Maximum	0.01	Median	0.01
SD	0.00214	CV	0.229
k hat (MLE)	8.392	k star (bias corrected MLE)	7.627
Theta hat (MLE)	0.00111	Theta star (bias corrected MLE)	0.00122

nu hat (MLE)	537.1	nu star (bias corrected)	488.1
MLE Mean (bias corrected)	0.00934	MLE Sd (bias corrected)	0.00338
95% Percentile of Chisquare (2kstar)	25.33	90% Percentile	0.0139
95% Percentile	0.0155	99% Percentile	0.0189

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0178	0.0187	95% Approx. Gamma UPL	0.0156	0.0162
95% Gamma USL	0.0209	0.0224			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00141	SD (KM)	7.0945E-4
Variance (KM)	5.0332E-7	SE of Mean (KM)	1.5360E-4
k hat (KM)	3.947	k star (KM)	3.598
nu hat (KM)	252.6	nu star (KM)	230.3
theta hat (KM)	3.5710E-4	theta star (KM)	3.9176E-4
80% gamma percentile (KM)	0.00197	90% gamma percentile (KM)	0.00241
95% gamma percentile (KM)	0.00281	99% gamma percentile (KM)	0.00368

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.00259	0.00254	95% Approx. Gamma UPL	0.00228	0.00224
95% KM Gamma Percentile	0.00223	0.00219	95% Gamma USL	0.00301	0.00297

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00139	Mean in Log Scale	-6.663
SD in Original Scale	7.8138E-4	SD in Log Scale	0.373
95% UTL95% Coverage	0.00289	95% BCA UTL95% Coverage	0.00517
95% Bootstrap (%) UTL95% Coverage	0.00517	95% UPL (t)	0.00243
90% Percentile (z)	0.00206	95% Percentile (z)	0.00236
99% Percentile (z)	0.00304	95% USL	0.00359

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-6.62	95% KM UTL (Lognormal)95% Coverage	0.00242
KM SD of Logged Data	0.272	95% KM UPL (Lognormal)	0.00213
95% KM Percentile Lognormal (z)	0.00208	95% KM USL (Lognormal)	0.00283

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00107	Mean in Log Scale	-6.943
SD in Original Scale	8.0395E-4	SD in Log Scale	0.366
95% UTL95% Coverage	0.00215	95% UPL (t)	0.00181
90% Percentile (z)	0.00154	95% Percentile (z)	0.00176
99% Percentile (z)	0.00226	95% USL	0.00266

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	0.00517
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.00344
95% USL	0.00517	95% KM Chebyshev UPL	0.00455

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcKM, Capped (|sb|pah|hmw|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	21		
Number of Detects	4	Number of Non-Detects	28
Number of Distinct Detects	4	Number of Distinct Non-Detects	17
Minimum Detect	0.00729	Minimum Non-Detect	0.00621
Maximum Detect	0.0339	Maximum Non-Detect	0.00738
Variance Detected	1.4343E-4	Percent Non-Detects	87.5%
Mean Detected	0.0173	SD Detected	0.012
Mean of Detected Logged Data	-4.233	SD of Detected Logged Data	0.678

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0076	KM SD	0.00518
95% UTL95% Coverage	0.0189	95% KM UPL (t)	0.0165
90% KM Percentile (z)	0.0142	95% KM Percentile (z)	0.0161
99% KM Percentile (z)	0.0197	95% KM USL	0.022

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.00513	SD	0.00597
95% UTL95% Coverage	0.0182	95% UPL (t)	0.0154
90% Percentile (z)	0.0128	95% Percentile (z)	0.015
99% Percentile (z)	0.019	95% USL	0.0217

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.275	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.249	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.012	k star (bias corrected MLE)	0.92
Theta hat (MLE)	0.00574	Theta star (bias corrected MLE)	0.0188
nu hat (MLE)	24.1	nu star (bias corrected)	7.358
MLE Mean (bias corrected)	0.0173		
MLE Sd (bias corrected)	0.018	95% Percentile of Chisquare (2kstar)	5.677

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00729	Mean	0.0109
Maximum	0.0339	Median	0.01
SD	0.00446	CV	0.409
k hat (MLE)	12.46	k star (bias corrected MLE)	11.32
Theta hat (MLE)	8.7539E-4	Theta star (bias corrected MLE)	9.6416E-4
nu hat (MLE)	797.7	nu star (bias corrected)	724.3
MLE Mean (bias corrected)	0.0109	MLE Sd (bias corrected)	0.00324
95% Percentile of Chisquare (2kstar)	34.72	90% Percentile	0.0152
95% Percentile	0.0167	99% Percentile	0.0198

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0188	0.0185	95% Approx. Gamma UPL	0.0168	0.0166
95% Gamma USL	0.0215	0.0213			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0076	SD (KM)	0.00518
Variance (KM)	2.6872E-5	SE of Mean (KM)	0.00106
k hat (KM)	2.147	k star (KM)	1.967
nu hat (KM)	137.4	nu star (KM)	125.9
theta hat (KM)	0.00354	theta star (KM)	0.00386
80% gamma percentile (KM)	0.0114	90% gamma percentile (KM)	0.0148
95% gamma percentile (KM)	0.0181	99% gamma percentile (KM)	0.0254

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0161	0.0158	95% Approx. Gamma UPL	0.0138	0.0135
95% KM Gamma Percentile	0.0134	0.0131	95% Gamma USL	0.0194	0.0191

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk GOF Test**

5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00259	Mean in Log Scale	-7.451
SD in Original Scale	0.00677	SD in Log Scale	1.456
95% UTL95% Coverage	0.014	95% BCA UTL95% Coverage	0.0339
95% Bootstrap (%) UTL95% Coverage	0.0339	95% UPL (t)	0.00713
90% Percentile (z)	0.00375	95% Percentile (z)	0.00637
99% Percentile (z)	0.0172	95% USL	0.0329

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-4.975	95% KM UTL (Lognormal)95% Coverage	0.0148
KM SD of Logged Data	0.349	95% KM UPL (Lognormal)	0.0126
95% KM Percentile Lognormal (z)	0.0123	95% KM USL (Lognormal)	0.0182

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.00513	Mean in Log Scale	-5.504
SD in Original Scale	0.00597	SD in Log Scale	0.534
95% UTL95% Coverage	0.0131	95% UPL (t)	0.0102
90% Percentile (z)	0.00806	95% Percentile (z)	0.00979
99% Percentile (z)	0.0141	95% USL	0.0179

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	0.0339
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0235
95% USL	0.0339	95% KM Chebyshev UPL	0.0305

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcKM, Capped (|sb|pah|lmw|)

General Statistics

Total Number of Observations	32	Number of Missing Observations	0
Number of Distinct Observations	22		
Number of Detects	6	Number of Non-Detects	26
Number of Distinct Detects	6	Number of Distinct Non-Detects	16
Minimum Detect	0.00758	Minimum Non-Detect	0.00621
Maximum Detect	0.0204	Maximum Non-Detect	0.00738
Variance Detected	2.5380E-5	Percent Non-Detects	81.25%
Mean Detected	0.0114	SD Detected	0.00504

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Mean of Detected Logged Data	-4.547	SD of Detected Logged Data	0.391

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.186	d2max (for USL)	2.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.795	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.00718	KM SD	0.00283
95% UTL95% Coverage	0.0134	95% KM UPL (t)	0.012
90% KM Percentile (z)	0.0108	95% KM Percentile (z)	0.0118
99% KM Percentile (z)	0.0138	95% KM USL	0.015

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0049	SD	0.00375
95% UTL95% Coverage	0.0131	95% UPL (t)	0.0114
90% Percentile (z)	0.0097	95% Percentile (z)	0.0111
99% Percentile (z)	0.0136	95% USL	0.0153

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.586	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.293	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	7.367	k star (bias corrected MLE)	3.794
Theta hat (MLE)	0.00154	Theta star (bias corrected MLE)	0.00299
nu hat (MLE)	88.4	nu star (bias corrected)	45.53
MLE Mean (bias corrected)	0.0114		
MLE Sd (bias corrected)	0.00583	95% Percentile of Chisquare (2kstar)	14.92

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00758	Mean	0.0103
Maximum	0.0204	Median	0.01
SD	0.00209	CV	0.204
k hat (MLE)	35.17	k star (bias corrected MLE)	31.89
Theta hat (MLE)	2.9161E-4	Theta star (bias corrected MLE)	3.2156E-4
nu hat (MLE)	2251	nu star (bias corrected)	2041
MLE Mean (bias corrected)	0.0103	MLE Sd (bias corrected)	0.00182

95% Percentile of Chisquare (2kstar)	83.43		90% Percentile	0.0126	
95% Percentile	0.0134		99% Percentile	0.0149	

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0145	0.0144	95% Approx. Gamma UPL	0.0135	0.0134
95% Gamma USL	0.0158	0.0158			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00718	SD (KM)	0.00283
Variance (KM)	8.0062E-6	SE of Mean (KM)	5.4794E-4
k hat (KM)	6.431	k star (KM)	5.849
nu hat (KM)	411.6	nu star (KM)	374.3
theta hat (KM)	0.00112	theta star (KM)	0.00123
80% gamma percentile (KM)	0.00948	90% gamma percentile (KM)	0.0111
95% gamma percentile (KM)	0.0126	99% gamma percentile (KM)	0.0158

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.0125	0.0124	95% Approx. Gamma UPL	0.0111	0.011
95% KM Gamma Percentile	0.0109	0.0108	95% Gamma USL	0.0144	0.0143

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.00366	Mean in Log Scale	-6.006
SD in Original Scale	0.00431	SD in Log Scale	0.806
95% UTL95% Coverage	0.0144	95% BCA UTL95% Coverage	0.0204
95% Bootstrap (%) UTL95% Coverage	0.0204	95% UPL (t)	0.00987
90% Percentile (z)	0.00692	95% Percentile (z)	0.00928
99% Percentile (z)	0.0161	95% USL	0.023

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-4.981	95% KM UTL (Lognormal)95% Coverage	0.0121
KM SD of Logged Data	0.26	95% KM UPL (Lognormal)	0.0107
95% KM Percentile Lognormal (z)	0.0105	95% KM USL (Lognormal)	0.0141

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0049	Mean in Log Scale	-5.471
SD in Original Scale	0.00375	SD in Log Scale	0.479
95% UTL95% Coverage	0.012	95% UPL (t)	0.0096
90% Percentile (z)	0.00778	95% Percentile (z)	0.00926
99% Percentile (z)	0.0128	95% USL	0.0159

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	32	95% UTL with95% Coverage	0.0204
Approx, f used to compute achieved CC	1.684	Approximate Actual Confidence Coefficient achieved by UTL	0.806
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.0163
95% USL	0.0204	95% KM Chebyshev UPL	0.0197

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcKM, Capped (|ss|pah|bapeq|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	30		
Number of Detects	26	Number of Non-Detects	4
Number of Distinct Detects	26	Number of Distinct Non-Detects	4
Minimum Detect	1.8626E-4	Minimum Non-Detect	0.00166
Maximum Detect	0.642	Maximum Non-Detect	0.00199
Variance Detected	0.0171	Percent Non-Detects	13.33%
Mean Detected	0.048	SD Detected	0.131
Mean of Detected Logged Data	-5.117	SD of Detected Logged Data	2.14

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.405	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.397	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.0417	KM SD	0.121
95% UTL95% Coverage	0.309	95% KM UPL (t)	0.25
90% KM Percentile (z)	0.196	95% KM Percentile (z)	0.24
99% KM Percentile (z)	0.322	95% KM USL	0.373

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0417	SD	0.123
95% UTL95% Coverage	0.314	95% UPL (t)	0.253
90% Percentile (z)	0.199	95% Percentile (z)	0.243
99% Percentile (z)	0.327	95% USL	0.378

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.419	**Anderson-Darling GOF Test**

5% A-D Critical Value	0.846	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.205	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.185	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.327	k star (bias corrected MLE)	0.315
Theta hat (MLE)	0.147	Theta star (bias corrected MLE)	0.153
nu hat (MLE)	17	nu star (bias corrected)	16.37
MLE Mean (bias corrected)	0.048		
MLE Sd (bias corrected)	0.0856	95% Percentile of Chisquare (2kstar)	2.835

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.8626E-4	Mean	0.0429
Maximum	0.642	Median	0.00868
SD	0.122	CV	2.846
k hat (MLE)	0.353	k star (bias corrected MLE)	0.34
Theta hat (MLE)	0.122	Theta star (bias corrected MLE)	0.126
nu hat (MLE)	21.2	nu star (bias corrected)	20.41
MLE Mean (bias corrected)	0.0429	MLE Sd (bias corrected)	0.0736
95% Percentile of Chisquare (2kstar)	2.987	90% Percentile	0.125
95% Percentile	0.189	99% Percentile	0.352

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.237	0.248	95% Approx. Gamma UPL	0.152	0.148
95% Gamma USL	0.359	0.403			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0417	SD (KM)	0.121
Variance (KM)	0.0145	SE of Mean (KM)	0.0224
k hat (KM)	0.12	k star (KM)	0.13
nu hat (KM)	7.187	nu star (KM)	7.801
theta hat (KM)	0.348	theta star (KM)	0.321
80% gamma percentile (KM)	0.0399	90% gamma percentile (KM)	0.121
95% gamma percentile (KM)	0.235	99% gamma percentile (KM)	0.579

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.229	0.237	95% Approx. Gamma UPL	0.143	0.138
95% KM Gamma Percentile	0.132	0.125	95% Gamma USL	0.351	0.394

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0668	**Lilliefors GOF Test**

5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0417	Mean in Log Scale	-5.41
SD in Original Scale	0.123	SD in Log Scale	2.128
95% UTL95% Coverage	0.503	95% BCA UTL95% Coverage	0.457
95% Bootstrap (%) UTL95% Coverage	0.642	95% UPL (t)	0.176
90% Percentile (z)	0.0684	95% Percentile (z)	0.148
99% Percentile (z)	0.631	95% USL	1.539

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-5.421	95% KM UTL (Lognormal)95% Coverage	0.493
KM SD of Logged Data	2.123	95% KM UPL (Lognormal)	0.173
95% KM Percentile Lognormal (z)	0.145	95% KM USL (Lognormal)	1.504

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0417	Mean in Log Scale	-5.368
SD in Original Scale	0.123	SD in Log Scale	2.092
95% UTL95% Coverage	0.485	95% UPL (t)	0.173
90% Percentile (z)	0.068	95% Percentile (z)	0.145
99% Percentile (z)	0.605	95% USL	1.453

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	0.642
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.416
95% USL	0.642	95% KM Chebyshev UPL	0.576

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcKM, Capped (|ss|pah|hmw|)

General Statistics

Total Number of Observations	30	Number of Missing Observations	0
Number of Distinct Observations	30		
Number of Detects	26	Number of Non-Detects	4
Number of Distinct Detects	26	Number of Distinct Non-Detects	4
Minimum Detect	0.00819	Minimum Non-Detect	0.00648
Maximum Detect	2.563	Maximum Non-Detect	0.00774
Variance Detected	0.33	Percent Non-Detects	13.33%
Mean Detected	0.252	SD Detected	0.574
Mean of Detected Logged Data	-2.981	SD of Detected Logged Data	1.732

ProUCL Output - Background Threshold Values (with NDs)
(version 5.1.002)

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.483	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.219	KM SD	0.531
95% UTL95% Coverage	1.398	95% KM UPL (t)	1.136
90% KM Percentile (z)	0.9	95% KM Percentile (z)	1.093
99% KM Percentile (z)	1.454	95% KM USL	1.677

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.219	SD	0.54
95% UTL95% Coverage	1.418	95% UPL (t)	1.152
90% Percentile (z)	0.911	95% Percentile (z)	1.107
99% Percentile (z)	1.475	95% USL	1.702

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.032	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.828	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.192	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.183	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.409	k star (bias corrected MLE)	0.387
Theta hat (MLE)	0.617	Theta star (bias corrected MLE)	0.651
nu hat (MLE)	21.26	nu star (bias corrected)	20.14
MLE Mean (bias corrected)	0.252		
MLE Sd (bias corrected)	0.405	95% Percentile of Chisquare (2kstar)	3.255

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00819	Mean	0.22
Maximum	2.563	Median	0.0221
SD	0.54	CV	2.455
k hat (MLE)	0.392	k star (bias corrected MLE)	0.375
Theta hat (MLE)	0.561	Theta star (bias corrected MLE)	0.586
nu hat (MLE)	23.53	nu star (bias corrected)	22.51
MLE Mean (bias corrected)	0.22	MLE Sd (bias corrected)	0.359
95% Percentile of Chisquare (2kstar)	3.187	90% Percentile	0.628
95% Percentile	0.934	99% Percentile	1.709

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.221	1.256	95% Approx. Gamma UPL	0.787	0.76
95% Gamma USL	1.835	2.018			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.219	SD (KM)	0.531
Variance (KM)	0.282	SE of Mean (KM)	0.0988
k hat (KM)	0.171	k star (KM)	0.176
nu hat (KM)	10.25	nu star (KM)	10.56
theta hat (KM)	1.284	theta star (KM)	1.247
80% gamma percentile (KM)	0.268	90% gamma percentile (KM)	0.661
95% gamma percentile (KM)	1.167	99% gamma percentile (KM)	2.591

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.191	1.227	95% Approx. Gamma UPL	0.767	0.741
95% KM Gamma Percentile	0.708	0.677	95% Gamma USL	1.791	1.972

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.219	Mean in Log Scale	-3.5
SD in Original Scale	0.54	SD in Log Scale	2.096
95% UTL95% Coverage	3.168	95% BCA UTL95% Coverage	2.563
95% Bootstrap (%) UTL95% Coverage	2.563	95% UPL (t)	1.128
90% Percentile (z)	0.443	95% Percentile (z)	0.949
99% Percentile (z)	3.959	95% USL	9.521

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-3.256	95% KM UTL (Lognormal)95% Coverage	1.791
KM SD of Logged Data	1.729	95% KM UPL (Lognormal)	0.764
95% KM Percentile Lognormal (z)	0.662	95% KM USL (Lognormal)	4.44

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.219	Mean in Log Scale	-3.336
SD in Original Scale	0.54	SD in Log Scale	1.853
95% UTL95% Coverage	2.177	95% UPL (t)	0.873
90% Percentile (z)	0.382	95% Percentile (z)	0.75
99% Percentile (z)	2.651	95% USL	5.761

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

ProUCL Output - Background Threshold Values (with NDs)

(version 5.1.002)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	30	95% UTL with95% Coverage	2.563
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2.005
95% USL	2.563	95% KM Chebyshev UPL	2.572

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ConcKM, Capped (|ss|pah|lmw|)

General Statistics

Total Number of Observations	30	Number of Distinct Observations	29
Minimum	0.00663	First Quartile	0.00894
Second Largest	1.017	Median	0.0164
Maximum	1.026	Third Quartile	0.0768
Mean	0.124	SD	0.266
Coefficient of Variation	2.153	Skewness	2.916
Mean of logged Data	-3.501	SD of logged Data	1.531

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.22	d2max (for USL)	2.745

Normal GOF Test

Shapiro Wilk Test Statistic	0.488	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	0.714	90% Percentile (z)	0.464
95% UPL (t)	0.583	95% Percentile (z)	0.561
95% USL	0.854	99% Percentile (z)	0.742

Gamma GOF Test

A-D Test Statistic	3.293	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.819	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.258	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.17	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.457	k star (bias corrected MLE)	0.433
Theta hat (MLE)	0.27	Theta star (bias corrected MLE)	0.285
nu hat (MLE)	27.41	nu star (bias corrected)	26
MLE Mean (bias corrected)	0.124	MLE Sd (bias corrected)	0.188

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	0.441	90% Percentile	0.344
95% Hawkins Wixley (HW) Approx. Gamma UPL	0.43	95% Percentile	0.499
95% WH Approx. Gamma UTL with 95% Coverage	0.672	99% Percentile	0.887
95% HW Approx. Gamma UTL with 95% Coverage	0.691		
95% WH USL	0.993	95% HW USL	1.086

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	0.903	90% Percentile (z)	0.215
95% UPL (t)	0.424	95% Percentile (z)	0.374
95% USL	2.017	99% Percentile (z)	1.062

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	30	95% UTL with 95% Coverage	1.026
Approx, f used to compute achieved CC	1.579	Approximate Actual Confidence Coefficient achieved by UTL	0.785
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1.026	95% BCA Bootstrap UTL with 95% Coverage	1.026
95% UPL	1.021	90% Percentile	0.317
90% Chebyshev UPL	0.935	95% Percentile	0.791
95% Chebyshev UPL	1.302	99% Percentile	1.023
95% USL	1.026		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

Appendix C.2

Background Groundwater Statistical Results

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TABLE OF CONTENTS

LIST OF ATTACHMENTS

FIGURES (ATTACHMENT B)

TABLES (ATTACHMENT D)

ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BTV	background threshold value
DoD	Department of Defense
DQO	data quality objective
FUDS	formerly used defense site
HHRA	Human Health Risk Assessment
JV	Joint-Venture
LNAPL	light non-aqueous phase liquid
LOD	limit of detection
LOQ	limit of quantitation
MDL	method detection limit
NY	New York
RI	Remedial Investigation
UPL	upper prediction limit
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTL	upper tolerance limit

EXECUTIVE SUMMARY

Camp Hero is a formerly used defense site (FUDS) undergoing a Remedial Investigation and Feasibility Study (RI/FS) under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA).

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, New York, approximately 5 miles east of the Village of Montauk. The former Camp Hero was established in early 1942 as a Coastal Defense Installation and the facility changed ownership within the military multiple times over the course of the following decades. Between 1974 and 1984, site lands were transferred to State, Local, and other Federal agencies, and the facility was permanently closed in 1982. The area is now used as Camp Hero State Park and is owned by the New York State Parks Commission.

Former Department of Defense (DoD) activities at Camp Hero may have resulted in contaminated material or an environmental release from these materials at certain Areas of Concern (AOCs). Forty-seven AOCs were identified as part of the RI. The AOCs include former waste disposal areas, former coal storage areas, abandoned drum locations, possible and former underground storage tanks, and a Motor Pool building, among others.

The primary objectives of the background groundwater study are to: 1) provide groundwater background threshold values (BTVs) for screening metal aconcentrations, and 2) provide background groundwater data sets for statistical background means comparisons, where needed, for the baseline human health risk assessment (HHRA). Groundwater BTVs are used to distinguish metal concentrations within decision units or exposure areas considered in the HHRA from naturally occurring or anthropogenic background conditions. Decision units or exposure areas with chemical concentrations that are above risk-based screening criteria and BTVs and/or are statistically above the background mean using hypothesis testing are carried forward for further evaluation in the CERCLA process.

U.S. Environmental Protection Agency (USEPA) ProUCL 5.1 statistical software and PAleontological STatistics (PAST) 3.13 data analysis software were used to conduct the statistical analysis of the background groundwater data. The analysis included summary statistics, goodness-of-fit testing, permutation testing, outlier testing, and finally BTV calculations. Table ES-1 summarizes the BTVs selected for the groundwater medium.

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1.0 INTRODUCTION

Camp Hero is a formerly used defense site (FUDS) undergoing a Remedial Investigation and Feasibility Study (RI/FS) under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA). A total of 47 areas of concern (AOCs) have been identified during previous investigations, which included Phase I and II RI field investigations. This RI/FS program for Camp Hero is being conducted by AECOM in coordination with the United States Army Corps of Engineers (USACE), New England and New York Districts, as well as the Environmental and Munitions (EM) Center of Expertise (CX).

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, New York, approximately 5 miles east of the Village of Montauk. The former Camp Hero was established in early 1942 as a Coastal Defense Installation and the facility changed ownership within the military multiple times over the course of the following decades. Between 1974 and 1984, site lands were transferred to State, Local, and other Federal agencies, and the facility was permanently closed in 1982. The area is now used as Camp Hero State Park and is owned by the New York State Parks Commission.

Former Department of Defense (DoD) activities at Camp Hero may have resulted in contaminated material or an environmental release from these materials at certain Areas of Concern (AOCs). Forty-seven AOCs were identified as part of the RI. The AOCs include former waste disposal areas, former coal storage areas, abandoned drum locations, possible and former underground storage tanks, and a Motor Pool building, among others. The primary objective of the Phase II RI field investigation was to install 15 background monitoring wells to collect background groundwater data and to investigate the extent of light non-aqueous phase liquid (LNAPL) and related constituents in soil and groundwater at the former Building 203 AOC; the investigation results are documented in the Camp Hero Phase II Field Investigation Report (AECOM-Tidewater JV, 2017).

The purpose of conducting the background groundwater study and deriving background threshold values (BTVs) is to help identify what AOCs require further evaluation in the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) Remedial Investigation (RI), Feasibility Study, Proposed Plan, and Decision Document process for Camp Hero.

1.1 Background Groundwater Study Scope and Objectives

The primary objectives of the background groundwater study are to: 1) provide groundwater BTVs for screening metal concentrations, and 2) provide background groundwater data sets for statistical background means comparisons, where needed, for the baseline human health risk assessment (HHRA).

1.2 Background Groundwater Study Organization

This Background Groundwater Study is organized into the following sections:

- Section 1: Introduction – Describes the purpose of the study, including its scope and objectives.
- Section 2: Data Handling and Evaluation – Describes the groundwater background data set and how it was used to derive BTVs. This section includes summary statistics, limit of quantitation (LOQ) screening results, outlier evaluation, and permutation testing.
- Section 3: Development of Background Threshold Values (BTVs) – Describe how the BTVs were derived based on goodness-of-fit (GOF) distribution testing and how non-detects were handled. A brief discussion of the BTV results is also included.

All figures and tables referenced in the text are provided in Attachment B and Attachment C of the report, respectively.

The following attachments are included in this background groundwater study:

- Attachment A contains the references for the background groundwater study.
- Attachment B contains the background sampling location figure.
- Attachment C contains the background data sample results.
- Attachment D contains the background data summary tables.
- Attachment E contains the ProUCL BTV output files.

2.0 DATA HANDLING AND EVALUATION

This section describes the background groundwater data set and how it was handled to effectively generate groundwater BTVs.

2.1 Background Groundwater Data Set

A total of 14 background groundwater samples (six wells from the east basin and eight wells from the west basin) were collected in December 2016. These two groundwater basins represent the groundwater types where most of the Camp Hero RI AOCs are located. The depth of the background wells, as well as the methods of field sampling and handling, are documented in the Camp Hero Phase II Field Investigation Report (AECOM-Tidewater JV, 2017). Figure 1 provided in Attachment B displays the locations of the background groundwater wells.

Dry perched groundwater conditions were generally not encountered during the December 2016 sampling event, and sufficient groundwater was produced for sampling; therefore, a second round of sampling (scheduled for Spring of 2017) was not required.

In summary, the sample sizes for the background groundwater samples are as follows:

- n = 6 for groundwater in the east basin (at locations CH-MW005, CH-MW006, CH-MW007, CH-MW009, CH-MW010, and CH-MW012)
- n = 8 for groundwater in the west basin (at locations CH-MW001, CH-MW002, CH-MW003, CH-MW004, CH-MW011, CH-MW013, CH-MW014, and CH-MW015)

Attachment C presents the background groundwater sample results.

2.2 Data Evaluation and Handling

Background samples were analyzed using United States Environmental Protection Agency (USEPA) method SW6020A (all other metals), SW7470A (mercury), and E218.6 (chromium VI), for both dissolved and total fractions. All validated, qualified data were considered usable for the BTV derivation, and there were no unusable or rejected ("R" qualified) samples.

The limit of quantitation (LOQ) is the lowest concentration of a substance that produces a quantitative result within specified limits of precision and bias. The LOQ is typically larger than the limit of detection (LOD; but may be equal to the LOD, depending upon the acceptance limits for precision and bias); therefore, the following is true:

$$\text{Method Detection Limit (MDL)} < \text{LOD} \leq \text{LOQ}$$

Quantitative results can only be achieved at or above the LOQ. Measurements between the MDL and the LOQ assure the presence of the analyte with confidence, but their numeric values are estimates ("J" qualified).

No "B" qualified results (blank contamination) were identified in the background groundwater data set. However, "J" qualified results (estimated values) were identified and were carried forward as detect results. Where applicable, the average of the field and duplicate samples were used to represent the sample.

During statistical evaluation, monitoring well CH-MW011 was deemed to be an outlier. The fall of 2016 was a notably dry season with low-precipitation, leading to drought conditions and decreased perched groundwater availability at some background well locations. Insufficient groundwater was present at CH-MW011 to fully develop the newly-installed well or to complete sampling via low-flow methodology. Instead, the well was developed to the extent possible by removing a few gallons of water over multiple development cycles and a grab-groundwater sample was collected. The minimal development and the grab sampling technique likely did not produce a sample representative of aquifer conditions.Statistical results are presented for both the background data sets with and without the outlier; however, the set of results without the outlier is recommended to be used, and the set of results for all locations (including the outlier) is for reference purposes only.

After excluding CH-MW011, there was no indication that there were other outliers through the graphical displays, and the project team did not identify any issues or errors for all the other groundwater background data collected, and therefore, no other statistical outliers or extreme values were excluded in the subsequent BTV calculation.

Tables 1 and 2 (provided in Attachment D) present the summary statistics for background groundwater concentrations, without and with the outlier, respectively. The USEPA's ProUCL 5.1 statistical software was used to generate the summary statistics (USEPA, 2015).

USACE and AECOM discussed the consideration of uncensored analytical data (USACE, 2016). Uncensored data can be useful to minimize information loss for non-detected analytical results. For the dataset generated for this background evaluation, uncensored analytical data were not available; however, the majority of analytical results were detected values. The groundwater analytical results provided by the laboratory were compared to the MDL and LOQ to assess potential impact of deriving the BTVs. Table 3 presents the MDL and LOQ censoring summary for all metals, for both dissolved and total fractions, and without and with the outlier.

The majority of the metals were detected at 100% or close to 100%, or not detected above the LOQ at all, so the use of uncensored data was not needed. For 27 fraction-analytes (of the without outlier set) where all sample results were non-detects (NDs) or below LOQ, the LOD or the LOQ was used as the BTV (i.e., uncensored data were not needed).

The only metals with non-detect results where the team needed to consider the MDL, LOD, and/or LOQ rather than the uncensored result were (total and dissolved) aluminum, chromium (VI), iron, and nickel, which were detected 31% to 85% in the eight data sets.

In all cases, the Kaplan-Meier (KM) method or the regression on order statistics (ROS) method was used in subsequent BTV calculation, when the data set contained non-detect values (see Section 3.2).

2.3 Permutation Testing

The objective of the permutation testing was to compare the mean concentrations of each metal collected from the east basin and the west basin, and determine if the means were statistically similar to each other. Table 4 summarizes the permutation testing results.

If the mean concentrations were determined to be similar, then the east and west basin data sets were combined to strengthen the derivation of the BTV. If the mean concentrations were significantly different, then the east and west basins should be analyzed separately for that particular metal.

The USEPA's ProUCL 5.1 statistical software was initially run to calculate summary statistics and perform goodness-of-fit test (GOF) for each metal from each basin (Singh and Maichle, 2015). This resulted in the analysis of 50 fraction-metals.

The PAST 3.13 data analysis software was used to compare means of east and west basins using either the Student's *t*-test or the permutation test (Monte Carlo, n = 9,999), based on the conditions specified below (Hammer et al., 2001):

- If both groundwater data sets were normally distributed:
  - Equal variance was tested using the *F*-test. If the variances were equal, then the Student's *t*-test was used to test if both mean concentrations were statistically similar.
  - In cases where the variances were not equal, the unequal variance version of the Student's *t*-test was used to test if both mean concentrations were statistically similar.
  - Results of the Student's *t*-test and Monte Carlo permutation test were both reported for the mean comparison.

- If one or both of the GOF results for the two groundwater data sets were not normally distributed, then only the Monte Carlo permutation test was used to compare mean concentrations.

- The H_0 stated that the two data sets were taken from populations with equal means. When $p < 0.05$, the H_0 is rejected.

- Both versions of the data set, without and with the outlier CH-MW011, were tested. ND data were censored at the full detection limit.

2.3.1 Discussion of Comparison Between East and West Basins

Using the GOF test, dissolved magnesium, dissolved nickel, dissolved vanadium, total cobalt, total magnesium, and total nickel were found to be normally distributed in both the east and west basins, for the without outlier CH-MW011 data set. In addition, dissolved and total magnesium were found to be normally distributed for the all locations data set. Thus, the mean comparisons for these analytes were based on the Student's *t*-test. For all other analytes where there were detected results, the permutation test was used to compare the means.

Only 1 out 50 fraction-analytes showed significant differences between the east basin and the west basin, for the without outlier CH-MW011 set, and this fraction-analyte was dissolved aluminum. (Note: Total aluminum showed no significant differences.) The *p*-value of the test was very marginal (0.0421) for a 5% significance level. It should be noted that if the *t*-Test or the Wilcoxon Rank Sum Test (a common test for median) were to be used, the conclusion would have been that the east basin and the west basin were not significant different at 5% significance level. In light of this, it is recommended to combine the east and west basins for all fraction-analytes, and thus, resulting a combined background sample size of 13 (without the outlier CH-MW011).

Although ND data were substituted by detection limit, which may create some uncertainties or reliability issues of the permutation test, graphical displays, such as box-and-whisker plots, were also used to visually inspect the differences between the east and west basins. These plots did not indicate there were evidences of significant or systematic differences between the east and west basins. As an additional line of evidence, the Wilcoxon Rank Sum Test also indicated that there were no significant differences for all 50 fraction-analytes. It should be noted that all detection limits reported for ND data were always below any detected results, and the detection limit did not vary sample-by-sample for almost all cases.

The statistical comparison of the perched groundwater from the east and west basins, which demonstrated similar populations, is consistent with the depositional setting of the two basins, which were formed under the same geologic conditions. The deposits which comprise the upper soil found in both basins are end products of the advance and retreat of several glaciers. Most of the material carried from the glacier was sand and well-rounded gravel, which was redeposited as stratified sand and gravel glacial till deposits. Upon further retreat of the ice, the till and parts of the outwash and morainic deposits were covered by water or wind-deposited silt, clay, and fine sand to varying depths, resulting in lenses and beds of silt and clay. The perched groundwater evaluated for the Camp Hero RI, including the background perched groundwater, was obtained from the same perched water bearing zone within the lenses and beds of silt and clay deposited across Camp Hero (United States Geological Survey [USGS] 1960).

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3.0 DEVELOPMENT OF BACKGROUND THRESHOLD VALUES (BTVs)

3.1 Overview of BTV Calculation

For each established background data set described above, the upper tolerance limit (UTL) was derived, which is representative of the upper bound of the data distribution. The assessed UTL95-95 represents the 95% confidence level of the 95% percentile of the background population. The UTL95-95 is a value that represents the upper limit of a tolerance interval such that 95% of the observations from the background population will be less than or equal to that upper-limit value with a confidence coefficient (CC) of 95%. The UTL95-95 is designed to simultaneously provide coverage for 95% of all potential observations (current and future) from the background population with a CC of 95%. The use of UTL95-95 is preferred to upper prediction limit (UPL95) when the number of future comparisons is large or unknown.

From an exceedance perspective, a UTL95-95 is the value that will be exceeded less than 5% of the time by all values potentially coming from the background population, with a CC of 95%. This is true for each chemical analyte. A parametric UTL95-95 takes into account the variability of current and future observations. When the data set does not follow a discernible distribution, a non-parametric UTL represented by a higher-order statistic (for example, the largest value or the second largest value) will be used as an estimate of BTV. Results derived using the ProUCL software (USEPA 2015) were used to determine UTL95-95 BTVs (see Attachment E). If a data set follows no discernible distribution, ProUCL determines the order statistic for a non-parametric UTL95-95 based on the sample size. This means that the order statistic to use is not fixed *a-priori* in ProUCL. The technical details, including the mathematical equation for determining the parametric and non-parametric UTLs, are described in Section 3.4 of the ProUCL Technical Guide (Singh and Singh, 2013). For data sets with non-detects, the technical details are described in Section 5.3.3 of the same document.

3.2 BTV Selection Process

For each established background data set, the normality of the data was first checked using the goodness-of-fit test in the ProUCL software. Based on the ProUCL guidelines, the Shapiro-Wilk W test was used for a sample size of 50 or less and the Lillifors test was used for a sample size greater than 50. If the data fit a normal distribution, the parametric (normal) method was used to derive the associated BTVs.

If the data did not fit a normal distribution, a possible fit to a gamma or lognormal distribution was evaluated. If the data fit a gamma distribution, the parametric (gamma) method was used to derive the BTVs. Otherwise, if the data fit a lognormal distribution, the parametric (lognormal) method was used to derive the BTVs. However, specific caution was employed when using lognormal-based UTL, and if such UTL was deemed to be unreliable or unstable, the non-parametric UTL was used instead. If the data did not fit any of the three aforementioned parametric distributions, the non-parametric method was used to derive the associated BTVs.

For each established data set containing one or more non-detects, the Kaplan-Meier (KM) method or the regression on order statistics (ROS) method was used to derive the associated BTVs. When a data set entirely consisted of non-detects, the Limit of Detection (LOD) was used as a non-statistical BTV. If a data set entirely or mostly consisted of non-detects and J-qualified results less than the Limit of Quantitation (LOQ), the LOQ was used as a non-statistical BTV.

3.3 Discussion of BTV Results

Table 5 (without the outlier CH-MW011) and Table 6 (all locations) summarize the results of the BTV calculations. The goodness-of-fit test results, along with the selected UTL95-95 and UTL calculation methods are presented. The UPL95 is also presented for reference and informational purposes only. Table 7 presents a condensed summary of UTL95-95 results for the recommended BTV set without the outlier CH-MW011. Attachment E presents the statistical outputs from the ProUCL software.

Thirteen fraction-analytes were entirely non-detects, and 14 fraction-analytes were entirely below LOQ (but have some "J" qualified detected results). In these cases, the LOD or the LOQ will be used as the non-statistical BTV. The majority of the other fraction-analytes were detected 100% or close to 100% and followed a parametric distribution (mostly normal or gamma). Thus, the background groundwater metal data sets were considered to be relatively robust and likely belonged to a single population without extreme values.

Attachment A

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Attachment B

Background Groundwater Sample Locations

MAP LOCATION

Groundwater Contour Interval = 5 feet

Surface water features obtained from National Hydrography Dataset (NHD) Dates of publication vary.

Groundwater measurements are from tempoary wells installed in June 2016

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Hillshade Vertical Exaggeration = 3X

0 400 800 Feet

1 inch = 400 feet

AECOM

3101 Wilson Blvd., Suite 900
Arlington, VA 22201
T 703-682-4900 F 703-682-4901

Figure 1
Background Groundwater Sampling Locations

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	April 2017	**Figure 1**

4/7/2017 1:4,800 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig 3-6 Background Groundwater Sampling.mxd

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Attachment C

Background Data Sample Results

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Table 1
Background Groundwater Data Sample Results
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW006	12/14/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.22	ug/L	Y		0.050	0.015
CH-MW006	12/14/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.19	ug/L	Y		0.050	0.015
CH-MW006	12/14/2016	N	SW6020A	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW006	12/14/2016	N	SW6020A	T	16065-83-1	Chromium(III), Insoluble Salts	1.1	ug/L	Y	J	4.0	0.59
CH-MW006	12/14/2016	N	SW6020A	T	7440-47-3	Chromium	1.3	ug/L	Y	J	4.0	0.59
CH-MW006	12/14/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	846	ug/L	Y		200	33.7
CH-MW006	12/14/2016	N	SW6020A	T	7439-92-1	Lead	1.5	ug/L	Y	J	2.0	0.090
CH-MW006	12/14/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	4450	ug/L	Y		200	11.7
CH-MW006	12/14/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	105	ug/L	Y		4.0	0.88
CH-MW006	12/14/2016	N	SW6020A	T	7440-02-0	Nickel	1.4	ug/L	Y	J	4.0	0.85
CH-MW006	12/14/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1340	ug/L	Y		400	66.9
CH-MW006	12/14/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW006	12/14/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW006	12/14/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW006	12/14/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW006	12/14/2016	N	SW6020A	T	7440-39-3	Barium	26.4	ug/L	Y		4.0	0.96
CH-MW006	12/14/2016	N	SW6020A	T	7440-41-7	Beryllium	0.11	ug/L	Y	J	1.0	0.11
CH-MW006	12/14/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW006	12/14/2016	N	SW6020A	T	7440-48-4	Cobalt	1.7	ug/L	Y		1.0	0.20
CH-MW006	12/14/2016	N	SW6020A	T	7440-50-8	Copper	0.73	ug/L	Y	J	4.0	0.52
CH-MW006	12/14/2016	N	SW6020A	T	7440-66-6	Zinc	3.7	ug/L	Y	J	30.0	3.5
CH-MW006	12/14/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	5310	ug/L	Y		400	98.1
CH-MW006	12/14/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW006	12/14/2016	N	SW6020A	D	7429-90-5	Aluminum	73.4	ug/L	Y	J	200	23.1
CH-MW006	12/14/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	78.6	ug/L	Y	J	200	33.7
CH-MW006	12/14/2016	N	SW6020A	D	7439-92-1	Lead	0.12	ug/L	Y	J	2.0	0.090
CH-MW006	12/14/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	3850	ug/L	Y		200	11.7
CH-MW006	12/14/2016	N	SW6020A	D	7440-02-0	Nickel	1.5	ug/L	Y	J	4.0	0.85
CH-MW006	12/14/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1010	ug/L	Y		400	66.9
CH-MW006	12/14/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW006	12/14/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	14700	ug/L	Y		400	46.8
CH-MW006	12/14/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW006	12/14/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW006	12/14/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW006	12/14/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW006	12/14/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW006	12/14/2016	N	SW6020A	D	7440-47-3	Chromium	0.65	ug/L	Y	J	4.0	0.59
CH-MW006	12/14/2016	N	SW6020A	D	7440-48-4	Cobalt	1.2	ug/L	Y		1.0	0.20
CH-MW006	12/14/2016	N	SW6020A	D	7440-50-8	Copper	2.5	ug/L	Y	J	4.0	0.52
CH-MW006	12/14/2016	N	SW6020A	D	7440-62-2	Vanadium	0.37	ug/L	Y	J	1.0	0.20
CH-MW006	12/14/2016	N	SW6020A	D	7440-66-6	Zinc	8	ug/L	Y	J	30.0	3.5
CH-MW006	12/14/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	4490	ug/L	Y		400	98.1
CH-MW006	12/14/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW006	12/14/2016	N	SW6020A	T	7429-90-5	Aluminum	1170	ug/L	Y		200	23.1
CH-MW006	12/14/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	15400	ug/L	Y		400	46.8
CH-MW006	12/14/2016	N	SW6020A	T	7440-62-2	Vanadium	1.3	ug/L	Y		1.0	0.20
CH-MW006	12/14/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	85.7	ug/L	Y		4.0	0.88
CH-MW006	12/14/2016	N	SW6020A	D	7440-39-3	Barium	14.7	ug/L	Y		4.0	0.96
CH-MW006	12/14/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW006	12/14/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW007	12/14/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.033	ug/L	Y	J	0.050	0.015
CH-MW007	12/14/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW007	12/14/2016	N	SW6020A	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW007	12/14/2016	N	SW6020A	T	16065-83-1	Chromium(III), Insoluble Salts	3.7	ug/L	Y	J	4.0	0.59
CH-MW007	12/14/2016	N	SW6020A	T	7440-47-3	Chromium	3.7	ug/L	Y	J	4.0	0.59
CH-MW007	12/14/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	2170	ug/L	Y		200	33.7
CH-MW007	12/14/2016	N	SW6020A	T	7439-92-1	Lead	0.85	ug/L	Y	J	2.0	0.090
CH-MW007	12/14/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	7870	ug/L	Y		200	11.7

Table 1
Background Groundwater Data Sample Results
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW007	12/14/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	1380	ug/L	Y		4.0	0.88
CH-MW007	12/14/2016	N	SW6020A	T	7440-02-0	Nickel	3.5	ug/L	Y	J	4.0	0.85
CH-MW007	12/14/2016	N	SW6020A	T	7440-09-7	Potassium (K)	4440	ug/L	Y		400	66.9
CH-MW007	12/14/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW007	12/14/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW007	12/14/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW007	12/14/2016	N	SW6020A	T	7440-38-2	Arsenic	0.73	ug/L	Y	J	4.0	0.68
CH-MW007	12/14/2016	N	SW6020A	T	7440-39-3	Barium	59.5	ug/L	Y		4.0	0.96
CH-MW007	12/14/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW007	12/14/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW007	12/14/2016	N	SW6020A	T	7440-48-4	Cobalt	2	ug/L	Y		1.0	0.20
CH-MW007	12/14/2016	N	SW6020A	T	7440-50-8	Copper	2.4	ug/L	Y	J	4.0	0.52
CH-MW007	12/14/2016	N	SW6020A	T	7440-66-6	Zinc	10.3	ug/L	Y	J	30.0	3.5
CH-MW007	12/14/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	12300	ug/L	Y		400	98.1
CH-MW007	12/14/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW007	12/14/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW007	12/14/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW007	12/14/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW007	12/14/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	7300	ug/L	Y		200	11.7
CH-MW007	12/14/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	1300	ug/L	Y		4.0	0.88
CH-MW007	12/14/2016	N	SW6020A	D	7440-02-0	Nickel	1.7	ug/L	Y	J	4.0	0.85
CH-MW007	12/14/2016	N	SW6020A	D	7440-09-7	Potassium (K)	3920	ug/L	Y		400	66.9
CH-MW007	12/14/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW007	12/14/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	63600	ug/L	Y		400	46.8
CH-MW007	12/14/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW007	12/14/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW007	12/14/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW007	12/14/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW007	12/14/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW007	12/14/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW007	12/14/2016	N	SW6020A	D	7440-48-4	Cobalt	0.99	ug/L	Y	J	1.0	0.20
CH-MW007	12/14/2016	N	SW6020A	D	7440-50-8	Copper	0.96	ug/L	Y	J	4.0	0.52
CH-MW007	12/14/2016	N	SW6020A	D	7440-62-2	Vanadium	0.4	ug/L	Y	J	1.0	0.20
CH-MW007	12/14/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW007	12/14/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	12200	ug/L	Y		400	98.1
CH-MW007	12/14/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW007	12/14/2016	N	SW6020A	T	7429-90-5	Aluminum	1740	ug/L	Y		200	23.1
CH-MW007	12/14/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	67600	ug/L	Y		400	46.8
CH-MW007	12/14/2016	N	SW6020A	T	7440-62-2	Vanadium	4.5	ug/L	Y		1.0	0.20
CH-MW007	12/14/2016	N	SW6020A	D	7440-39-3	Barium	40.7	ug/L	Y		4.0	0.96
CH-MW007	12/14/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW007	12/14/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW011	12/14/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.36	ug/L	Y		0.25	0.075
CH-MW011	12/14/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.48	ug/L	Y		0.25	0.075
CH-MW011	12/14/2016	N	SW6020A	D	16065-83-1	Chromium(III), Insoluble Salts	7.3	ug/L	Y		4.0	0.59
CH-MW011	12/14/2016	N	SW6020A	T	16065-83-1	Chromium(III), Insoluble Salts	27	ug/L	Y		4.0	0.59
CH-MW011	12/14/2016	N	SW6020A	T	7440-47-3	Chromium	27.5	ug/L	Y		4.0	0.59
CH-MW011	12/14/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	19400	ug/L	Y		200	33.7
CH-MW011	12/14/2016	N	SW6020A	T	7439-92-1	Lead	10.5	ug/L	Y		2.0	0.090
CH-MW011	12/14/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	7050	ug/L	Y		200	11.7
CH-MW011	12/14/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	1140	ug/L	Y		4.0	0.88
CH-MW011	12/14/2016	N	SW6020A	T	7440-02-0	Nickel	26.1	ug/L	Y		4.0	0.85
CH-MW011	12/14/2016	N	SW6020A	T	7440-09-7	Potassium (K)	5520	ug/L	Y		400	66.9
CH-MW011	12/14/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW011	12/14/2016	N	SW6020A	T	7440-28-0	Thallium	0.27	ug/L	Y	J	1.0	0.16
CH-MW011	12/14/2016	N	SW6020A	T	7440-36-0	Antimony	1.4	ug/L	Y	J	2.0	0.48
CH-MW011	12/14/2016	N	SW6020A	T	7440-38-2	Arsenic	7.8	ug/L	Y		4.0	0.68
CH-MW011	12/14/2016	N	SW6020A	T	7440-39-3	Barium	158	ug/L	Y		4.0	0.96

Table 1
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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW011	12/14/2016	N	SW6020A	T	7440-41-7	Beryllium	1.1	ug/L	Y		1.0	0.11
CH-MW011	12/14/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW011	12/14/2016	N	SW6020A	T	7440-48-4	Cobalt	18.1	ug/L	Y		1.0	0.20
CH-MW011	12/14/2016	N	SW6020A	T	7440-50-8	Copper	59.9	ug/L	Y		4.0	0.52
CH-MW011	12/14/2016	N	SW6020A	T	7440-66-6	Zinc	42.4	ug/L	Y		30.0	3.5
CH-MW011	12/14/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	10900	ug/L	Y		400	98.1
CH-MW011	12/14/2016	N	SW6020A	T	7782-49-2	Selenium	0.89	ug/L	Y	J	4.0	0.44
CH-MW011	12/14/2016	N	SW6020A	D	7429-90-5	Aluminum	2020	ug/L	Y		200	23.1
CH-MW011	12/14/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	2380	ug/L	Y		200	33.7
CH-MW011	12/14/2016	N	SW6020A	D	7439-92-1	Lead	1.4	ug/L	Y	J	2.0	0.090
CH-MW011	12/14/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	4090	ug/L	Y		200	11.7
CH-MW011	12/14/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	852	ug/L	Y		4.0	0.88
CH-MW011	12/14/2016	N	SW6020A	D	7440-02-0	Nickel	11.6	ug/L	Y		4.0	0.85
CH-MW011	12/14/2016	N	SW6020A	D	7440-09-7	Potassium (K)	2420	ug/L	Y		400	66.9
CH-MW011	12/14/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW011	12/14/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	101000	ug/L	Y		400	46.8
CH-MW011	12/14/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW011	12/14/2016	N	SW6020A	D	7440-36-0	Antimony	1.9	ug/L	Y	J	2.0	0.48
CH-MW011	12/14/2016	N	SW6020A	D	7440-38-2	Arsenic	2.7	ug/L	Y	J	4.0	0.68
CH-MW011	12/14/2016	N	SW6020A	D	7440-41-7	Beryllium	0.23	ug/L	Y	J	1.0	0.11
CH-MW011	12/14/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW011	12/14/2016	N	SW6020A	D	7440-47-3	Chromium	7.8	ug/L	Y		4.0	0.59
CH-MW011	12/14/2016	N	SW6020A	D	7440-48-4	Cobalt	11.2	ug/L	Y		1.0	0.20
CH-MW011	12/14/2016	N	SW6020A	D	7440-50-8	Copper	39.2	ug/L	Y		4.0	0.52
CH-MW011	12/14/2016	N	SW6020A	D	7440-62-2	Vanadium	10.1	ug/L	Y		1.0	0.20
CH-MW011	12/14/2016	N	SW6020A	D	7440-66-6	Zinc	9.7	ug/L	Y	J	30.0	3.5
CH-MW011	12/14/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	9440	ug/L	Y		400	98.1
CH-MW011	12/14/2016	N	SW6020A	D	7782-49-2	Selenium	0.68	ug/L	Y	J	4.0	0.44
CH-MW011	12/14/2016	N	SW6020A	T	7429-90-5	Aluminum	20500	ug/L	Y		200	23.1
CH-MW011	12/14/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	110000	ug/L	Y		400	46.8
CH-MW011	12/14/2016	N	SW6020A	T	7440-62-2	Vanadium	45.1	ug/L	Y		1.0	0.20
CH-MW011	12/14/2016	N	SW6020A	D	7440-39-3	Barium	55.6	ug/L	Y		4.0	0.96
CH-MW011	12/14/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW011	12/14/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW015	12/14/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW015	12/14/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW015	12/14/2016	N	SW6020A	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW015	12/14/2016	N	SW6020A	T	16065-83-1	Chromium(III), Insoluble Salts	1.1	ug/L	Y	J	4.0	0.59
CH-MW015	12/14/2016	N	SW6020A	T	7440-47-3	Chromium	1.1	ug/L	Y	J	4.0	0.59
CH-MW015	12/14/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	513	ug/L	Y		200	33.7
CH-MW015	12/14/2016	N	SW6020A	T	7439-92-1	Lead	0.63	ug/L	Y	J	2.0	0.090
CH-MW015	12/14/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	9520	ug/L	Y		200	11.7
CH-MW015	12/14/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	650	ug/L	Y		4.0	0.88
CH-MW015	12/14/2016	N	SW6020A	T	7440-02-0	Nickel	4.5	ug/L	Y		4.0	0.85
CH-MW015	12/14/2016	N	SW6020A	T	7440-09-7	Potassium (K)	2370	ug/L	Y		400	66.9
CH-MW015	12/14/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW015	12/14/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW015	12/14/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW015	12/14/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW015	12/14/2016	N	SW6020A	T	7440-39-3	Barium	43.4	ug/L	Y		4.0	0.96
CH-MW015	12/14/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW015	12/14/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW015	12/14/2016	N	SW6020A	T	7440-48-4	Cobalt	6.2	ug/L	Y		1.0	0.20
CH-MW015	12/14/2016	N	SW6020A	T	7440-50-8	Copper	0.75	ug/L	Y	J	4.0	0.52
CH-MW015	12/14/2016	N	SW6020A	T	7440-66-6	Zinc	11.3	ug/L	Y	J	30.0	3.5
CH-MW015	12/14/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	15500	ug/L	Y		400	98.1
CH-MW015	12/14/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW015	12/14/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1

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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW015	12/14/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	41.8	ug/L	Y	J	200	33.7
CH-MW015	12/14/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW015	12/14/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	9580	ug/L	Y		200	11.7
CH-MW015	12/14/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	525	ug/L	Y		4.0	0.88
CH-MW015	12/14/2016	N	SW6020A	D	7440-02-0	Nickel	4.3	ug/L	Y		4.0	0.85
CH-MW015	12/14/2016	N	SW6020A	D	7440-09-7	Potassium (K)	2130	ug/L	Y		400	66.9
CH-MW015	12/14/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW015	12/14/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	24300	ug/L	Y		400	46.8
CH-MW015	12/14/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW015	12/14/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW015	12/14/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW015	12/14/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW015	12/14/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW015	12/14/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW015	12/14/2016	N	SW6020A	D	7440-48-4	Cobalt	5.3	ug/L	Y		1.0	0.20
CH-MW015	12/14/2016	N	SW6020A	D	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW015	12/14/2016	N	SW6020A	D	7440-62-2	Vanadium	0.23	ug/L	Y	J	1.0	0.20
CH-MW015	12/14/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW015	12/14/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	14700	ug/L	Y		400	98.1
CH-MW015	12/14/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW015	12/14/2016	N	SW6020A	T	7429-90-5	Aluminum	385	ug/L	Y		200	23.1
CH-MW015	12/14/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	26500	ug/L	Y		400	46.8
CH-MW015	12/14/2016	N	SW6020A	T	7440-62-2	Vanadium	1.1	ug/L	Y		1.0	0.20
CH-MW015	12/14/2016	N	SW6020A	D	7440-39-3	Barium	37.5	ug/L	Y		4.0	0.96
CH-MW015	12/14/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW015	12/14/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW001	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW001	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW001	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW001	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW001	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW001	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW001	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	8390	ug/L	Y		200	11.7
CH-MW001	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	1110	ug/L	Y		4.0	0.88
CH-MW001	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	2.5	ug/L	Y	J	4.0	0.85
CH-MW001	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	3940	ug/L	Y		400	66.9
CH-MW001	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW001	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW001	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW001	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	1.1	ug/L	Y	J	4.0	0.68
CH-MW001	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW001	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW001	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW001	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	3.8	ug/L	Y		1.0	0.20
CH-MW001	12/13/2016	N	SW6020A	D	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW001	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW001	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	26.7	ug/L	Y	J	200	23.1
CH-MW001	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	30000	ug/L	Y		200	33.7
CH-MW001	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.14	ug/L	Y	J	2.0	0.090
CH-MW001	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	7370	ug/L	Y		200	11.7
CH-MW001	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	3	ug/L	Y	J	4.0	0.85
CH-MW001	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	3550	ug/L	Y		400	66.9
CH-MW001	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW001	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW001	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW001	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	1.2	ug/L	Y	J	4.0	0.68
CH-MW001	12/13/2016	N	SW6020A	T	7440-39-3	Barium	158	ug/L	Y		4.0	0.96
CH-MW001	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11

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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW001	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW001	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW001	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	4	ug/L	Y		1.0	0.20
CH-MW001	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW001	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.23	ug/L	Y	J	1.0	0.20
CH-MW001	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	9.3	ug/L	Y	J	30.0	3.5
CH-MW001	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	18900	ug/L	Y		400	98.1
CH-MW001	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW001	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	33100	ug/L	Y		200	33.7
CH-MW001	12/13/2016	N	SW6020A	D	7440-39-3	Barium	156	ug/L	Y		4.0	0.96
CH-MW001	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW001	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	6.5	ug/L	Y	J	30.0	3.5
CH-MW001	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	298000	ug/L	Y		2000	234
CH-MW001	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	297000	ug/L	Y		8000	936
CH-MW001	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	20500	ug/L	Y		400	98.1
CH-MW001	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	1040	ug/L	Y		4.0	0.88
CH-MW001	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW001	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW003	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW003	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW003	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW003	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW003	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW003	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW003	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW003	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	6360	ug/L	Y		200	11.7
CH-MW003	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	293	ug/L	Y		4.0	0.88
CH-MW003	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	2.5	ug/L	Y	J	4.0	0.85
CH-MW003	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	2900	ug/L	Y		400	66.9
CH-MW003	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW003	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	22700	ug/L	Y		400	46.8
CH-MW003	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW003	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW003	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW003	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW003	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW003	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW003	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	1.9	ug/L	Y		1.0	0.20
CH-MW003	12/13/2016	N	SW6020A	D	7440-50-8	Copper	0.55	ug/L	Y	J	4.0	0.52
CH-MW003	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW003	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW003	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	137	ug/L	Y	J	200	23.1
CH-MW003	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	196	ug/L	Y	J	200	33.7
CH-MW003	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.1	ug/L	Y	J	2.0	0.090
CH-MW003	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	5740	ug/L	Y		200	11.7
CH-MW003	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	2.9	ug/L	Y	J	4.0	0.85
CH-MW003	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	2660	ug/L	Y		400	66.9
CH-MW003	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW003	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	20800	ug/L	Y		400	46.8
CH-MW003	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW003	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW003	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	0.72	ug/L	Y	J	4.0	0.68
CH-MW003	12/13/2016	N	SW6020A	T	7440-39-3	Barium	28.6	ug/L	Y		4.0	0.96
CH-MW003	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW003	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW003	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW003	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	1.9	ug/L	Y		1.0	0.20
CH-MW003	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52

Table 1
Background Groundwater Data Sample Results
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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW003	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.83	ug/L	Y	J	1.0	0.20
CH-MW003	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW003	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	9360	ug/L	Y		400	98.1
CH-MW003	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW003	12/13/2016	N	SW6020A	D	7440-39-3	Barium	22.1	ug/L	Y		4.0	0.96
CH-MW003	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.41	ug/L	Y	J	1.0	0.20
CH-MW003	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	9610	ug/L	Y		400	98.1
CH-MW003	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	279	ug/L	Y		4.0	0.88
CH-MW003	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW003	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW004	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.069	ug/L	Y		0.050	0.015
CH-MW004	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW004	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	425	ug/L	Y		200	33.7
CH-MW004	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW004	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	1780	ug/L	Y		200	11.7
CH-MW004	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	1.3	ug/L	Y	J	4.0	0.85
CH-MW004	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	956	ug/L	Y		400	66.9
CH-MW004	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW004	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	7770	ug/L	Y		400	46.8
CH-MW004	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW004	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW004	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW004	12/13/2016	N	SW6020A	T	7440-39-3	Barium	8.6	ug/L	Y		4.0	0.96
CH-MW004	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW004	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW004	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	0.49	ug/L	Y	J	1.0	0.20
CH-MW004	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW004	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW004	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW004	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	5550	ug/L	Y		400	98.1
CH-MW004	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW004	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	167	ug/L	Y		4.0	0.88
CH-MW004	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW004	12/13/2016	FD	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	FD	E218.6	T	18540-29-9	Chromium(VI)	0.092	ug/L	Y		0.050	0.015
CH-MW004	12/13/2016	FD	SW6020A	T	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW004	12/13/2016	FD	SW6020A	T	7439-89-6	Iron (Fe)	367	ug/L	Y		200	33.7
CH-MW004	12/13/2016	FD	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW004	12/13/2016	FD	SW6020A	T	7439-95-4	Magnesium (Mg)	1720	ug/L	Y		200	11.7
CH-MW004	12/13/2016	FD	SW6020A	T	7440-02-0	Nickel	1.1	ug/L	Y	J	4.0	0.85
CH-MW004	12/13/2016	FD	SW6020A	T	7440-09-7	Potassium (K)	925	ug/L	Y		400	66.9
CH-MW004	12/13/2016	FD	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW004	12/13/2016	FD	SW6020A	T	7440-23-5	Sodium (Na)	7850	ug/L	Y		400	46.8
CH-MW004	12/13/2016	FD	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW004	12/13/2016	FD	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW004	12/13/2016	FD	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW004	12/13/2016	FD	SW6020A	T	7440-39-3	Barium	8.2	ug/L	Y		4.0	0.96
CH-MW004	12/13/2016	FD	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW004	12/13/2016	FD	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW004	12/13/2016	FD	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	FD	SW6020A	T	7440-48-4	Cobalt	0.49	ug/L	Y	J	1.0	0.20
CH-MW004	12/13/2016	FD	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW004	12/13/2016	FD	SW6020A	T	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW004	12/13/2016	FD	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW004	12/13/2016	FD	SW6020A	T	7440-70-2	Calcium (Ca)	5520	ug/L	Y		400	98.1
CH-MW004	12/13/2016	FD	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44

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Background Groundwater Data Sample Results
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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW004	12/13/2016	FD	SW6020A	T	7439-96-5	Manganese (Mn)	140	ug/L	Y		4.0	0.88
CH-MW004	12/13/2016	FD	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW004	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.082	ug/L	Y		0.050	0.015
CH-MW004	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	UJ	200	23.1
CH-MW004	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW004	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	1840	ug/L	Y		200	11.7
CH-MW004	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	160	ug/L	Y		4.0	0.88
CH-MW004	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	1.8	ug/L	Y	J	4.0	0.85
CH-MW004	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1080	ug/L	Y		400	66.9
CH-MW004	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW004	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	8290	ug/L	Y		400	46.8
CH-MW004	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW004	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW004	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW004	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW004	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW004	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	0.91	ug/L	Y	J	1.0	0.20
CH-MW004	12/13/2016	N	SW6020A	D	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW004	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW004	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW004	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	357	ug/L	Y		200	33.7
CH-MW004	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW004	12/13/2016	N	SW6020A	D	7440-39-3	Barium	9.9	ug/L	Y		4.0	0.96
CH-MW004	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	5880	ug/L	Y		400	98.1
CH-MW004	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW004	12/13/2016	FD	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	FD	E218.6	D	18540-29-9	Chromium(VI)	0.091	ug/L	Y		0.050	0.015
CH-MW004	12/13/2016	FD	SW6020A	D	7429-90-5	Aluminum	26.4	ug/L	Y	J	200	23.1
CH-MW004	12/13/2016	FD	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW004	12/13/2016	FD	SW6020A	D	7439-95-4	Magnesium (Mg)	1900	ug/L	Y		200	11.7
CH-MW004	12/13/2016	FD	SW6020A	D	7440-02-0	Nickel	1.4	ug/L	Y	J	4.0	0.85
CH-MW004	12/13/2016	FD	SW6020A	D	7440-09-7	Potassium (K)	1020	ug/L	Y		400	66.9
CH-MW004	12/13/2016	FD	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW004	12/13/2016	FD	SW6020A	D	7440-23-5	Sodium (Na)	7980	ug/L	Y		400	46.8
CH-MW004	12/13/2016	FD	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW004	12/13/2016	FD	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW004	12/13/2016	FD	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW004	12/13/2016	FD	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW004	12/13/2016	FD	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW004	12/13/2016	FD	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW004	12/13/2016	FD	SW6020A	D	7440-48-4	Cobalt	1.1	ug/L	Y		1.0	0.20
CH-MW004	12/13/2016	FD	SW6020A	D	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW004	12/13/2016	FD	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW004	12/13/2016	FD	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW004	12/13/2016	FD	SW6020A	D	7439-89-6	Iron (Fe)	374	ug/L	Y		200	33.7
CH-MW004	12/13/2016	FD	SW6020A	D	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW004	12/13/2016	FD	SW6020A	D	7439-96-5	Manganese (Mn)	178	ug/L	Y		4.0	0.88
CH-MW004	12/13/2016	FD	SW6020A	D	7440-39-3	Barium	9.4	ug/L	Y		4.0	0.96
CH-MW004	12/13/2016	FD	SW6020A	D	7440-70-2	Calcium (Ca)	5900	ug/L	Y		400	98.1
CH-MW004	12/13/2016	FD	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW005	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW005	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW005	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.45	ug/L	Y		0.050	0.015
CH-MW005	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.45	ug/L	Y		0.050	0.015
CH-MW005	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW005	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7

Table 1
Background Groundwater Data Sample Results
Camp Hero Remedial Investigation
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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW005	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW005	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	3800	ug/L	Y		200	11.7
CH-MW005	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	104	ug/L	Y		4.0	0.88
CH-MW005	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW005	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1230	ug/L	Y		400	66.9
CH-MW005	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW005	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	11800	ug/L	Y		400	46.8
CH-MW005	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW005	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW005	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW005	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW005	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW005	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	0.65	ug/L	Y	J	1.0	0.20
CH-MW005	12/13/2016	N	SW6020A	D	7440-50-8	Copper	0.54	ug/L	Y	J	4.0	0.52
CH-MW005	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW005	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW005	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW005	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW005	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW005	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	3600	ug/L	Y		200	11.7
CH-MW005	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW005	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1120	ug/L	Y		400	66.9
CH-MW005	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW005	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	10300	ug/L	Y		400	46.8
CH-MW005	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW005	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW005	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW005	12/13/2016	N	SW6020A	T	7440-39-3	Barium	9.4	ug/L	Y		4.0	0.96
CH-MW005	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW005	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW005	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW005	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	0.38	ug/L	Y	J	1.0	0.20
CH-MW005	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW005	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.24	ug/L	Y	J	1.0	0.20
CH-MW005	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW005	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	3840	ug/L	Y		400	98.1
CH-MW005	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW005	12/13/2016	N	SW6020A	D	7440-39-3	Barium	7.3	ug/L	Y		4.0	0.96
CH-MW005	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	0.65	ug/L	Y	J	4.0	0.59
CH-MW005	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.53	ug/L	Y	J	1.0	0.20
CH-MW005	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	4040	ug/L	Y		400	98.1
CH-MW005	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	85.6	ug/L	Y		4.0	0.88
CH-MW005	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW005	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW009	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW009	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW009	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW009	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW009	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	167	ug/L	Y	J	200	23.1
CH-MW009	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW009	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	4190	ug/L	Y		200	11.7
CH-MW009	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	101	ug/L	Y		4.0	0.88
CH-MW009	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	1	ug/L	Y	J	4.0	0.85
CH-MW009	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1940	ug/L	Y		400	66.9
CH-MW009	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW009	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	26100	ug/L	Y		400	46.8
CH-MW009	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW009	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48

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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW009	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW009	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.26	ug/L	Y	J	1.0	0.11
CH-MW009	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW009	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	1.6	ug/L	Y		1.0	0.20
CH-MW009	12/13/2016	N	SW6020A	D	7440-50-8	Copper	0.81	ug/L	Y	J	4.0	0.52
CH-MW009	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW009	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW009	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	191	ug/L	Y	J	200	23.1
CH-MW009	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	223	ug/L	Y		200	33.7
CH-MW009	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW009	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	3870	ug/L	Y		200	11.7
CH-MW009	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	1.3	ug/L	Y	J	4.0	0.85
CH-MW009	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1690	ug/L	Y		400	66.9
CH-MW009	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW009	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	23400	ug/L	Y		400	46.8
CH-MW009	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW009	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW009	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW009	12/13/2016	N	SW6020A	T	7440-39-3	Barium	48.5	ug/L	Y		4.0	0.96
CH-MW009	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.13	ug/L	Y	J	1.0	0.11
CH-MW009	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW009	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW009	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	0.97	ug/L	Y	J	1.0	0.20
CH-MW009	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1.1	ug/L	Y	J	4.0	0.52
CH-MW009	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.25	ug/L	Y	J	1.0	0.20
CH-MW009	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	5.4	ug/L	Y	J	30.0	3.5
CH-MW009	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	3500	ug/L	Y		400	98.1
CH-MW009	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW009	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	218	ug/L	Y		200	33.7
CH-MW009	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW009	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW009	12/13/2016	N	SW6020A	D	7440-39-3	Barium	51.1	ug/L	Y		4.0	0.96
CH-MW009	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	3750	ug/L	Y		400	98.1
CH-MW009	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	79.3	ug/L	Y		4.0	0.88
CH-MW009	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW009	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW010	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW010	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW010	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.044	ug/L	Y	J	0.050	0.015
CH-MW010	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.059	ug/L	Y		0.050	0.015
CH-MW010	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	338	ug/L	Y		200	23.1
CH-MW010	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW010	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW010	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	2230	ug/L	Y		200	11.7
CH-MW010	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	149	ug/L	Y		4.0	0.88
CH-MW010	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	1.6	ug/L	Y	J	4.0	0.85
CH-MW010	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1290	ug/L	Y		400	66.9
CH-MW010	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW010	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	17000	ug/L	Y		400	46.8
CH-MW010	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW010	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW010	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW010	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW010	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW010	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW010	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	0.73	ug/L	Y	J	1.0	0.20
CH-MW010	12/13/2016	N	SW6020A	D	7440-50-8	Copper	0.82	ug/L	Y	J	4.0	0.52
CH-MW010	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5

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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW010	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW010	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	32	ug/L	Y	J	200	23.1
CH-MW010	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW010	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW010	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	1970	ug/L	Y		200	11.7
CH-MW010	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW010	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1080	ug/L	Y		400	66.9
CH-MW010	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW010	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	15400	ug/L	Y		400	46.8
CH-MW010	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW010	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW010	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW010	12/13/2016	N	SW6020A	T	7440-39-3	Barium	6.1	ug/L	Y		4.0	0.96
CH-MW010	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW010	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW010	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW010	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	0.21	ug/L	Y	J	1.0	0.20
CH-MW010	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW010	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.33	ug/L	Y	J	1.0	0.20
CH-MW010	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW010	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	3470	ug/L	Y		400	98.1
CH-MW010	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW010	12/13/2016	N	SW6020A	D	7440-39-3	Barium	5.6	ug/L	Y		4.0	0.96
CH-MW010	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.26	ug/L	Y	J	1.0	0.20
CH-MW010	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	4120	ug/L	Y		400	98.1
CH-MW010	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	134	ug/L	Y		4.0	0.88
CH-MW010	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW010	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW012	12/13/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW012	12/13/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW012	12/13/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.016	ug/L	Y	J	0.050	0.015
CH-MW012	12/13/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW012	12/13/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW012	12/13/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW012	12/13/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	2440	ug/L	Y		200	11.7
CH-MW012	12/13/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	950	ug/L	Y		4.0	0.88
CH-MW012	12/13/2016	N	SW6020A	D	7440-02-0	Nickel	2.7	ug/L	Y	J	4.0	0.85
CH-MW012	12/13/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1880	ug/L	Y		400	66.9
CH-MW012	12/13/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW012	12/13/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	14500	ug/L	Y		400	46.8
CH-MW012	12/13/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW012	12/13/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW012	12/13/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW012	12/13/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW012	12/13/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW012	12/13/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW012	12/13/2016	N	SW6020A	D	7440-48-4	Cobalt	3.6	ug/L	Y		1.0	0.20
CH-MW012	12/13/2016	N	SW6020A	D	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW012	12/13/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW012	12/13/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW012	12/13/2016	N	SW6020A	T	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW012	12/13/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	101	ug/L	Y	J	200	33.7
CH-MW012	12/13/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW012	12/13/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	2380	ug/L	Y		200	11.7
CH-MW012	12/13/2016	N	SW6020A	T	7440-02-0	Nickel	3.2	ug/L	Y	J	4.0	0.85
CH-MW012	12/13/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1830	ug/L	Y		400	66.9
CH-MW012	12/13/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW012	12/13/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	12600	ug/L	Y		400	46.8

Table 1
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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW012	12/13/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW012	12/13/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW012	12/13/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW012	12/13/2016	N	SW6020A	T	7440-39-3	Barium	19.1	ug/L	Y		4.0	0.96
CH-MW012	12/13/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW012	12/13/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW012	12/13/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW012	12/13/2016	N	SW6020A	T	7440-48-4	Cobalt	3.1	ug/L	Y		1.0	0.20
CH-MW012	12/13/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW012	12/13/2016	N	SW6020A	T	7440-62-2	Vanadium	0.3	ug/L	Y	J	1.0	0.20
CH-MW012	12/13/2016	N	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW012	12/13/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	16900	ug/L	Y		400	98.1
CH-MW012	12/13/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW012	12/13/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	78.6	ug/L	Y	J	200	33.7
CH-MW012	12/13/2016	N	SW6020A	D	7440-39-3	Barium	18	ug/L	Y		4.0	0.96
CH-MW012	12/13/2016	N	SW6020A	D	7440-62-2	Vanadium	0.55	ug/L	Y	J	1.0	0.20
CH-MW012	12/13/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	16200	ug/L	Y		400	98.1
CH-MW012	12/13/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	806	ug/L	Y		4.0	0.88
CH-MW012	12/13/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW012	12/13/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW013	12/12/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW013	12/12/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW013	12/12/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.069	ug/L	Y		0.050	0.015
CH-MW013	12/12/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.066	ug/L	Y		0.050	0.015
CH-MW013	12/12/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW013	12/12/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW013	12/12/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW013	12/12/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	5680	ug/L	Y		200	11.7
CH-MW013	12/12/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	456	ug/L	Y		4.0	0.88
CH-MW013	12/12/2016	N	SW6020A	D	7440-02-0	Nickel	1.5	ug/L	Y	J	4.0	0.85
CH-MW013	12/12/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1420	ug/L	Y		400	66.9
CH-MW013	12/12/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW013	12/12/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	11300	ug/L	Y		400	46.8
CH-MW013	12/12/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW013	12/12/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW013	12/12/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW013	12/12/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW013	12/12/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW013	12/12/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW013	12/12/2016	N	SW6020A	D	7440-50-8	Copper	0.68	ug/L	Y	J	4.0	0.52
CH-MW013	12/12/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW013	12/12/2016	N	SW6020A	T	7429-90-5	Aluminum	38.6	ug/L	Y	J	200	23.1
CH-MW013	12/12/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	48	ug/L	Y	J	200	33.7
CH-MW013	12/12/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW013	12/12/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	5400	ug/L	Y		200	11.7
CH-MW013	12/12/2016	N	SW6020A	T	7440-02-0	Nickel	2.5	ug/L	Y	J	4.0	0.85
CH-MW013	12/12/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1380	ug/L	Y		400	66.9
CH-MW013	12/12/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW013	12/12/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	10500	ug/L	Y		400	46.8
CH-MW013	12/12/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW013	12/12/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW013	12/12/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW013	12/12/2016	N	SW6020A	T	7440-39-3	Barium	18.4	ug/L	Y		4.0	0.96
CH-MW013	12/12/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW013	12/12/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW013	12/12/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW013	12/12/2016	N	SW6020A	T	7440-48-4	Cobalt	3	ug/L	Y		1.0	0.20
CH-MW013	12/12/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52

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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW013	12/12/2016	N	SW6020A	T	7440-62-2	Vanadium	0.3	ug/L	Y	J	1.0	0.20
CH-MW013	12/12/2016	N	SW6020A	T	7440-66-6	Zinc	4.1	ug/L	Y	J	30.0	3.5
CH-MW013	12/12/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	8280	ug/L	Y		400	98.1
CH-MW013	12/12/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW013	12/12/2016	N	SW6020A	D	7440-39-3	Barium	19.3	ug/L	Y		4.0	0.96
CH-MW013	12/12/2016	N	SW6020A	D	7440-62-2	Vanadium	0.5	ug/L	N	U	1.0	0.20
CH-MW013	12/12/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW013	12/12/2016	N	SW6020A	D	7440-48-4	Cobalt	3.1	ug/L	Y		1.0	0.20
CH-MW013	12/12/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	8330	ug/L	Y		400	98.1
CH-MW013	12/12/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	457	ug/L	Y		4.0	0.88
CH-MW013	12/12/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW013	12/12/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW014	12/12/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW014	12/12/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW014	12/12/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW014	12/12/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.05	ug/L	N	U	0.050	0.015
CH-MW014	12/12/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW014	12/12/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW014	12/12/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	12700	ug/L	Y		200	11.7
CH-MW014	12/12/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	561	ug/L	Y		4.0	0.88
CH-MW014	12/12/2016	N	SW6020A	D	7440-02-0	Nickel	6.1	ug/L	Y		4.0	0.85
CH-MW014	12/12/2016	N	SW6020A	D	7440-09-7	Potassium (K)	3230	ug/L	Y		400	66.9
CH-MW014	12/12/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW014	12/12/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	34900	ug/L	Y		400	46.8
CH-MW014	12/12/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW014	12/12/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW014	12/12/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW014	12/12/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW014	12/12/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW014	12/12/2016	N	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW014	12/12/2016	N	SW6020A	D	7440-48-4	Cobalt	6.2	ug/L	Y		1.0	0.20
CH-MW014	12/12/2016	N	SW6020A	D	7440-50-8	Copper	1	ug/L	Y	J	4.0	0.52
CH-MW014	12/12/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW014	12/12/2016	N	SW6020A	T	7429-90-5	Aluminum	32.5	ug/L	Y	J	200	23.1
CH-MW014	12/12/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	104	ug/L	Y	J	200	33.7
CH-MW014	12/12/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW014	12/12/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	11600	ug/L	Y		200	11.7
CH-MW014	12/12/2016	N	SW6020A	T	7440-02-0	Nickel	4.7	ug/L	Y		4.0	0.85
CH-MW014	12/12/2016	N	SW6020A	T	7440-09-7	Potassium (K)	3000	ug/L	Y		400	66.9
CH-MW014	12/12/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW014	12/12/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	30400	ug/L	Y		400	46.8
CH-MW014	12/12/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW014	12/12/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW014	12/12/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW014	12/12/2016	N	SW6020A	T	7440-39-3	Barium	59.6	ug/L	Y		4.0	0.96
CH-MW014	12/12/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW014	12/12/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW014	12/12/2016	N	SW6020A	T	7440-47-3	Chromium	2	ug/L	N	U	4.0	0.59
CH-MW014	12/12/2016	N	SW6020A	T	7440-48-4	Cobalt	5.7	ug/L	Y		1.0	0.20
CH-MW014	12/12/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW014	12/12/2016	N	SW6020A	T	7440-62-2	Vanadium	0.6	ug/L	Y	J	1.0	0.20
CH-MW014	12/12/2016	N	SW6020A	T	7440-66-6	Zinc	5.6	ug/L	Y	J	30.0	3.5
CH-MW014	12/12/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	16700	ug/L	Y		400	98.1
CH-MW014	12/12/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW014	12/12/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	44.8	ug/L	Y	J	200	33.7
CH-MW014	12/12/2016	N	SW6020A	D	7440-39-3	Barium	58.8	ug/L	Y		4.0	0.96
CH-MW014	12/12/2016	N	SW6020A	D	7440-62-2	Vanadium	0.45	ug/L	Y	J	1.0	0.20
CH-MW014	12/12/2016	N	SW6020A	D	7440-66-6	Zinc	3.7	ug/L	Y	J	30.0	3.5

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Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW014	12/12/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	17300	ug/L	Y		400	98.1
CH-MW014	12/12/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	470	ug/L	Y		4.0	0.88
CH-MW014	12/12/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW014	12/12/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW002	12/11/2016	N	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW002	12/11/2016	N	E218.6	T	18540-29-9	Chromium(VI)	0.55	ug/L	Y	J+	0.050	0.015
CH-MW002	12/11/2016	N	SW6020A	T	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW002	12/11/2016	N	SW6020A	T	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW002	12/11/2016	N	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW002	12/11/2016	N	SW6020A	T	7439-95-4	Magnesium (Mg)	6150	ug/L	Y	J-	200	11.7
CH-MW002	12/11/2016	N	SW6020A	T	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW002	12/11/2016	N	SW6020A	T	7440-09-7	Potassium (K)	1380	ug/L	Y		400	66.9
CH-MW002	12/11/2016	N	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW002	12/11/2016	N	SW6020A	T	7440-23-5	Sodium (Na)	34600	ug/L	Y	J-	400	46.8
CH-MW002	12/11/2016	N	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW002	12/11/2016	N	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW002	12/11/2016	N	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW002	12/11/2016	N	SW6020A	T	7440-39-3	Barium	21.6	ug/L	Y		4.0	0.96
CH-MW002	12/11/2016	N	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW002	12/11/2016	N	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW002	12/11/2016	N	SW6020A	T	7440-47-3	Chromium	0.8	ug/L	Y	J	4.0	0.59
CH-MW002	12/11/2016	N	SW6020A	T	7440-48-4	Cobalt	0.24	ug/L	Y	J	1.0	0.20
CH-MW002	12/11/2016	N	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW002	12/11/2016	N	SW6020A	T	7440-62-2	Vanadium	0.26	ug/L	Y	J	1.0	0.20
CH-MW002	12/11/2016	N	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW002	12/11/2016	N	SW6020A	T	7440-70-2	Calcium (Ca)	7170	ug/L	Y	J-	400	98.1
CH-MW002	12/11/2016	N	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW002	12/11/2016	N	SW6020A	T	7439-96-5	Manganese (Mn)	19.7	ug/L	Y		4.0	0.88
CH-MW002	12/11/2016	N	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW002	12/11/2016	FD	CALCULATION	T	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW002	12/11/2016	FD	E218.6	T	18540-29-9	Chromium(VI)	0.56	ug/L	Y		0.050	0.015
CH-MW002	12/11/2016	FD	SW6020A	T	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW002	12/11/2016	FD	SW6020A	T	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW002	12/11/2016	FD	SW6020A	T	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW002	12/11/2016	FD	SW6020A	T	7439-95-4	Magnesium (Mg)	5890	ug/L	Y		200	11.7
CH-MW002	12/11/2016	FD	SW6020A	T	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW002	12/11/2016	FD	SW6020A	T	7440-09-7	Potassium (K)	1340	ug/L	Y		400	66.9
CH-MW002	12/11/2016	FD	SW6020A	T	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW002	12/11/2016	FD	SW6020A	T	7440-23-5	Sodium (Na)	33100	ug/L	Y		400	46.8
CH-MW002	12/11/2016	FD	SW6020A	T	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW002	12/11/2016	FD	SW6020A	T	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW002	12/11/2016	FD	SW6020A	T	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW002	12/11/2016	FD	SW6020A	T	7440-39-3	Barium	21	ug/L	Y		4.0	0.96
CH-MW002	12/11/2016	FD	SW6020A	T	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW002	12/11/2016	FD	SW6020A	T	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW002	12/11/2016	FD	SW6020A	T	7440-47-3	Chromium	0.72	ug/L	Y	J	4.0	0.59
CH-MW002	12/11/2016	FD	SW6020A	T	7440-48-4	Cobalt	0.28	ug/L	Y	J	1.0	0.20
CH-MW002	12/11/2016	FD	SW6020A	T	7440-50-8	Copper	1	ug/L	N	U	4.0	0.52
CH-MW002	12/11/2016	FD	SW6020A	T	7440-62-2	Vanadium	0.5	ug/L	N	UJ	1.0	0.20
CH-MW002	12/11/2016	FD	SW6020A	T	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW002	12/11/2016	FD	SW6020A	T	7440-70-2	Calcium (Ca)	7120	ug/L	Y		400	98.1
CH-MW002	12/11/2016	FD	SW6020A	T	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW002	12/11/2016	FD	SW6020A	T	7439-96-5	Manganese (Mn)	21.5	ug/L	Y		4.0	0.88
CH-MW002	12/11/2016	FD	SW7470A	T	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW002	12/11/2016	N	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW002	12/11/2016	N	E218.6	D	18540-29-9	Chromium(VI)	0.57	ug/L	Y		0.050	0.015
CH-MW002	12/11/2016	N	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW002	12/11/2016	N	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7

Table 1
Background Groundwater Data Sample Results
Camp Hero Remedial Investigation
Montauk, New York

Location ID	Sample Date	Sample Type Code	Analytical Method	Fraction	CAS Number	Analyte	Result	Unit	Detect Flag	Interpreted Qualifiers	Quantitation Limit	Method Detection Limit
CH-MW002	12/11/2016	N	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW002	12/11/2016	N	SW6020A	D	7439-95-4	Magnesium (Mg)	6310	ug/L	Y		200	11.7
CH-MW002	12/11/2016	N	SW6020A	D	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW002	12/11/2016	N	SW6020A	D	7440-09-7	Potassium (K)	1430	ug/L	Y		400	66.9
CH-MW002	12/11/2016	N	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW002	12/11/2016	N	SW6020A	D	7440-23-5	Sodium (Na)	36700	ug/L	Y		400	46.8
CH-MW002	12/11/2016	N	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW002	12/11/2016	N	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW002	12/11/2016	N	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW002	12/11/2016	N	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW002	12/11/2016	N	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW002	12/11/2016	N	SW6020A	D	7440-47-3	Chromium	0.96	ug/L	Y	J	4.0	0.59
CH-MW002	12/11/2016	N	SW6020A	D	7440-48-4	Cobalt	0.52	ug/L	Y	J	1.0	0.20
CH-MW002	12/11/2016	N	SW6020A	D	7440-50-8	Copper	1	ug/L	N	UJ	4.0	0.52
CH-MW002	12/11/2016	N	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW002	12/11/2016	N	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW002	12/11/2016	N	SW6020A	D	7440-62-2	Vanadium	0.5	ug/L	N	UJ	1.0	0.20
CH-MW002	12/11/2016	N	SW6020A	D	7440-39-3	Barium	21	ug/L	Y		4.0	0.96
CH-MW002	12/11/2016	N	SW6020A	D	7440-70-2	Calcium (Ca)	7020	ug/L	Y		400	98.1
CH-MW002	12/11/2016	N	SW6020A	D	7439-96-5	Manganese (Mn)	21.5	ug/L	Y		4.0	0.88
CH-MW002	12/11/2016	N	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050
CH-MW002	12/11/2016	FD	CALCULATION	D	16065-83-1	Chromium(III), Insoluble Salts	2	ug/L	N	U	4.0	0.59
CH-MW002	12/11/2016	FD	E218.6	D	18540-29-9	Chromium(VI)	0.55	ug/L	Y		0.050	0.015
CH-MW002	12/11/2016	FD	SW6020A	D	7429-90-5	Aluminum	50	ug/L	N	U	200	23.1
CH-MW002	12/11/2016	FD	SW6020A	D	7439-89-6	Iron (Fe)	100	ug/L	N	U	200	33.7
CH-MW002	12/11/2016	FD	SW6020A	D	7439-92-1	Lead	0.25	ug/L	N	U	2.0	0.090
CH-MW002	12/11/2016	FD	SW6020A	D	7439-95-4	Magnesium (Mg)	6830	ug/L	Y		200	11.7
CH-MW002	12/11/2016	FD	SW6020A	D	7440-02-0	Nickel	2	ug/L	N	U	4.0	0.85
CH-MW002	12/11/2016	FD	SW6020A	D	7440-09-7	Potassium (K)	1540	ug/L	Y		400	66.9
CH-MW002	12/11/2016	FD	SW6020A	D	7440-22-4	Silver	0.25	ug/L	N	U	1.0	0.12
CH-MW002	12/11/2016	FD	SW6020A	D	7440-23-5	Sodium (Na)	36000	ug/L	Y		400	46.8
CH-MW002	12/11/2016	FD	SW6020A	D	7440-28-0	Thallium	0.25	ug/L	N	U	1.0	0.16
CH-MW002	12/11/2016	FD	SW6020A	D	7440-36-0	Antimony	1	ug/L	N	U	2.0	0.48
CH-MW002	12/11/2016	FD	SW6020A	D	7440-38-2	Arsenic	2	ug/L	N	U	4.0	0.68
CH-MW002	12/11/2016	FD	SW6020A	D	7440-41-7	Beryllium	0.25	ug/L	N	U	1.0	0.11
CH-MW002	12/11/2016	FD	SW6020A	D	7440-43-9	Cadmium	0.5	ug/L	N	U	1.0	0.19
CH-MW002	12/11/2016	FD	SW6020A	D	7440-47-3	Chromium	2	ug/L	N	UJ	4.0	0.59
CH-MW002	12/11/2016	FD	SW6020A	D	7440-48-4	Cobalt	0.49	ug/L	Y	J	1.0	0.20
CH-MW002	12/11/2016	FD	SW6020A	D	7440-50-8	Copper	0.85	ug/L	Y	J	4.0	0.52
CH-MW002	12/11/2016	FD	SW6020A	D	7440-66-6	Zinc	7.5	ug/L	N	U	30.0	3.5
CH-MW002	12/11/2016	FD	SW6020A	D	7782-49-2	Selenium	1	ug/L	N	U	4.0	0.44
CH-MW002	12/11/2016	FD	SW6020A	D	7440-39-3	Barium	23	ug/L	Y		4.0	0.96
CH-MW002	12/11/2016	FD	SW6020A	D	7440-62-2	Vanadium	0.34	ug/L	Y	J	1.0	0.20
CH-MW002	12/11/2016	FD	SW6020A	D	7440-70-2	Calcium (Ca)	7070	ug/L	Y		400	98.1
CH-MW002	12/11/2016	FD	SW6020A	D	7439-96-5	Manganese (Mn)	22	ug/L	Y		4.0	0.88
CH-MW002	12/11/2016	FD	SW7470A	D	7439-97-6	Mercury	0.1	ug/L	N	U	0.20	0.050

Acronyms

Sample Type Code
- FD - field duplicate
- N - normal

Fraction
- D - dissolved
- T - total

Detect Flag
- N - no (not detected)
- Y - yes (detected)

Interpreted Qualifiers
- J - estimated value
- U - not detected

Attachment D

Background Data Summary Tables

Table ES-1
Selected Groundwater BTVs for Metals
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Upper Tolerance Limit (UTL) Without Outlier CH-MW11	
	Dissolved	Total
aluminum	299.4	2210
antimony	<0.48	<0.48
arsenic	<4	<4
barium	174.6	146.4
beryllium	<1	<1
cadmium	<0.19	<0.19
calcium (ca)	25218	24833
chromium	<4	<4
chromium(iii), insoluble salts	<0.59	<4
chromium(vi)	0.581	0.791
cobalt	7.374	7.679
copper	<4	<4
iron (fe)	33100	30000
lead	<2	<2
magnesium (mg)	14270	13458
manganese (mn)	1586	1571
mercury	<0.05	<0.05
nickel	7.028	5.919
potassium (k)	4914	4942
selenium	<0.44	<0.44
silver	<0.12	<0.12
sodium (na)	300488	305812
thallium	<0.16	<0.16
vanadium	<1	4.5
zinc	<30	<30

Notes
All groundwater analytical results are reported in ug/L.
Acronyms
BTV = background threshold value
ug/l = microgram per liter
UTL = upper tolerance limit

Table 1
Summary Statistics for Groundwater (Without Outlier CH-MW11)
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Number of Samples	Percent Detects (%)	Summary Statistics		Detected Values			Method Detection Limits (All Data)	
			Mean	Std Dev	Min	Max	Max Location	Min	Max
Without Outlier CH-MW11 - Dissolved (ug/L)									
aluminum	13	31%	62.52	88.67	26.4	338	CH-MW010	23.1	23.1
antimony	13	0%	--	--	--	--	--	0.48	0.48
arsenic	13	8%	--	--	1.1	1.1	CH-MW001	0.68	0.68
barium	13	100%	35.6	39.85	5.6	156	CH-MW001	0.96	0.96
beryllium	13	8%	--	--	0.26	0.26	CH-MW009	0.11	0.11
cadmium	13	0%	--	--	--	--	--	0.19	0.19
calcium (ca)	13	100%	9860	5750	3750	20500	CH-MW001	98.1	98.1
chromium	13	23%	0.628	0.0983	0.65	0.96	CH-MW002	0.59	0.59
chromium(iii), insoluble salts	13	0%	--	--	--	--	--	0.59	0.59
chromium(vi)	13	46%	0.117	0.174	0.059	0.56	CH-MW002	0.015	0.015
cobalt	13	100%	2.352	1.88	0.505	6.2	CH-MW014	0.2	0.2
copper	13	69%	0.83	0.512	0.54	2.5	CH-MW006	0.52	0.52
iron (fe)	13	54%	2625	8798	41.8	33100	CH-MW001	33.7	33.7
lead	13	8%	--	--	0.12	0.12	CH-MW006	0.09	0.09
magnesium (mg)	13	100%	5766	3184	1870	12700	CH-MW014	11.7	11.7
manganese (mn)	13	100%	448.1	426	21.75	1300	CH-MW007	0.88	0.88
mercury	13	0%	--	--	--	--	--	0.05	0.05
nickel	13	85%	2.208	1.443	1	6.1	CH-MW014	0.85	0.85
potassium (k)	13	100%	2110	1050	1010	3940	CH-MW001	66.9	66.9
selenium	13	0%	--	--	--	--	--	0.44	0.44
silver	13	0%	--	--	--	--	--	0.12	0.12
sodium (na)	13	100%	44876	77483	8135	298000	CH-MW001	46.8	234
thallium	13	0%	--	--	--	--	--	0.16	0.16
vanadium	13	69%	0.334	0.123	0.23	0.55	CH-MW012	0.2	0.2
zinc	13	23%	4.092	1.379	3.7	8	CH-MW006	3.5	3.5
Without Outlier CH-MW11 - Total (ug/L)									
aluminum	13	69%	295.8	516.6	26.7	1740	CH-MW007	23.1	23.1
antimony	13	0%	--	--	--	--	--	0.48	0.48
arsenic	13	23%	0.727	0.138	0.72	1.2	CH-MW001	0.68	0.68
barium	13	100%	38.98	40.22	6.1	158	CH-MW001	0.96	0.96
beryllium	13	15%	0.112	0.00533	0.11	0.13	CH-MW009	0.11	0.11
cadmium	13	0%	--	--	--	--	--	0.19	0.19
calcium (ca)	13	100%	9749	5647	3470	18900	CH-MW001	98.1	98.1
chromium	13	31%	0.936	0.828	0.76	3.7	CH-MW007	0.59	0.59
chromium(iii), insoluble salts	13	23%	0.908	0.826	1.1	3.7	CH-MW007	0.59	0.59
chromium(vi)	13	62%	0.119	0.174	0.016	0.555	CH-MW002	0.015	0.015
cobalt	13	100%	2.301	2.014	0.21	6.2	CH-MW015	0.2	0.2
copper	13	31%	0.743	0.505	0.73	2.4	CH-MW007	0.52	0.52
iron (fe)	13	77%	2669	7910	48	30000	CH-MW001	33.7	33.7
lead	13	38%	0.303	0.418	0.1	1.5	CH-MW006	0.09	0.09
magnesium (mg)	13	100%	5503	2978	1750	11600	CH-MW014	11.7	11.7
manganese (mn)	13	100%	435.4	425.1	20.6	1380	CH-MW007	0.88	0.88
mercury	13	0%	--	--	--	--	--	0.05	0.05
nickel	13	77%	2.365	1.33	1.2	4.7	CH-MW014	0.85	0.85
potassium (k)	13	100%	2059	1079	940.5	4440	CH-MW007	66.9	66.9
selenium	13	0%	--	--	--	--	--	0.44	0.44
silver	13	0%	--	--	--	--	--	0.12	0.12
sodium (na)	13	100%	43966	77627	7810	297000	CH-MW001	46.8	936
thallium	13	0%	--	--	--	--	--	0.16	0.16
vanadium	13	92%	0.803	1.123	0.23	4.5	CH-MW007	0.2	0.2
zinc	13	54%	5.438	2.778	3.7	11.3	CH-MW015	3.5	3.5

Notes

All groundwater analytical results are reported in ug/L.

If duplicates exist: (1) if the duplicate pair was both detects or both non-detects, the average of the duplicate results was used as a single data point; (2) if the duplicate pair contained a detect and a non-detect, the detected value was used.

If the dataset contains nondetects, summary statistics are estimated by the Kaplan-Meier (KM) method.

Summary statistics calculations are censored at the method detection limit (MDL).

Acronyms

% = percent
-- = no data
max = maximum
MDL = method detection limit
min = minimum
Std Dev = standard deviation
ug/l = microgram per liter

References

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USEPA. 2016. ProUCL Version 5.1.002 (Software). Retrieved from http://www.epa.gov/osp/hstl/tsc/software.htm. May.

Table 2
Summary Statistics for Groundwater (All Locations)
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Number of Samples	Percent Detects (%)	Summary Statistics		Detected Values			Method Detection Limits (All Data)	
			Mean	Std Dev	Min	Max	Max Location	Min	Max
All Locations - Dissolved (ug/L)									
aluminum	14	36%	202.3	511.3	26.4	2020	CH-MW011	23.1	23.1
antimony	14	7%	--	--	1.9	1.9	CH-MW011	0.48	0.48
arsenic	14	14%	0.854	0.523	1.1	2.7	CH-MW011	0.68	0.68
barium	14	100%	37.03	38.66	5.6	156	CH-MW001	0.96	0.96
beryllium	14	14%	0.129	0.0476	0.23	0.26	CH-MW009	0.11	0.11
cadmium	14	0%	--	--	--	--	--	0.19	0.19
calcium (ca)	14	100%	9830	5525	3750	20500	CH-MW001	98.1	98.1
chromium	14	29%	1.14	1.85	0.65	7.8	CH-MW011	0.59	0.59
chromium(iii), insoluble salts	14	7%	--	--	7.3	7.3	CH-MW011	0.59	0.59
chromium(vi)	14	50%	0.143	0.192	0.059	0.56	CH-MW002	0.015	0.075
cobalt	14	100%	2.984	2.976	0.505	11.2	CH-MW011	0.2	0.2
copper	14	71%	3.571	9.894	0.54	39.2	CH-MW011	0.52	0.52
iron (fe)	14	57%	2608	8478	41.8	33100	CH-MW001	33.7	33.7
lead	14	14%	0.186	0.337	0.12	1.4	CH-MW011	0.09	0.09
magnesium (mg)	14	100%	5646	3091	1870	12700	CH-MW014	11.7	11.7
manganese (mn)	14	100%	477	423.3	21.75	1300	CH-MW007	0.88	0.88
mercury	14	0%	--	--	--	--	--	0.05	0.05
nickel	14	86%	2.879	2.79	1	11.6	CH-MW011	0.85	0.85
potassium (k)	14	100%	2132	1012	1010	3940	CH-MW001	66.9	66.9
selenium	14	7%	--	--	0.68	0.68	CH-MW011	0.44	0.44
silver	14	0%	--	--	--	--	--	0.12	0.12
sodium (na)	14	100%	48885	75940	8135	298000	CH-MW001	46.8	234
thallium	14	0%	--	--	--	--	--	0.16	0.16
vanadium	14	71%	1.031	2.518	0.23	10.1	CH-MW011	0.2	0.2
zinc	14	29%	4.493	1.963	3.7	9.7	CH-MW011	3.5	3.5
All Locations - Total (ug/L)									
aluminum	14	71%	1739	5227	26.7	20500	CH-MW011	23.1	23.1
antimony	14	7%	--	--	1.4	1.4	CH-MW011	0.48	0.48
arsenic	14	29%	1.232	1.826	0.72	7.8	CH-MW011	0.68	0.68
barium	14	100%	47.48	50.05	6.1	158	CH-MW001 CH-MW011	0.96	0.96
beryllium	14	21%	0.182	0.255	0.11	1.1	CH-MW011	0.11	0.11
cadmium	14	0%	--	--	--	--	--	0.19	0.19
calcium (ca)	14	100%	9831	5435	3470	18900	CH-MW001	98.1	98.1
chromium	14	36%	2.834	6.888	0.76	27.5	CH-MW011	0.59	0.59
chromium(iii), insoluble salts	14	29%	2.771	6.767	1.1	27	CH-MW011	0.59	0.59
chromium(vi)	14	64%	0.136	0.178	0.016	0.555	CH-MW002	0.015	0.075
cobalt	14	100%	3.429	4.645	0.21	18.1	CH-MW011	0.2	0.2
copper	14	36%	4.969	15.24	0.73	59.9	CH-MW011	0.52	0.52
iron (fe)	14	79%	3864	8756	48	30000	CH-MW001	33.7	33.7
lead	14	43%	1.031	2.657	0.1	10.5	CH-MW011	0.09	0.09
magnesium (mg)	14	100%	5614	2891	1750	11600	CH-MW014	11.7	11.7
manganese (mn)	14	100%	485.7	449.7	20.6	1380	CH-MW007	0.88	0.88
mercury	14	0%	--	--	--	--	--	0.05	0.05
nickel	14	79%	4.061	6.246	1.2	26.1	CH-MW011	0.85	0.85
potassium (k)	14	100%	2306	1390	940.5	5520	CH-MW011	66.9	66.9
selenium	14	7%	--	--	0.89	0.89	CH-MW011	0.44	0.44
silver	14	0%	--	--	--	--	--	0.12	0.12
sodium (na)	14	100%	48683	76642	7810	297000	CH-MW001	46.8	936
thallium	14	7%	--	--	0.27	0.27	CH-MW011	0.16	0.16
vanadium	14	93%	3.967	11.46	0.23	45.1	CH-MW011	0.2	0.2
zinc	14	57%	8.079	9.888	3.7	42.4	CH-MW011	3.5	3.5

Notes
All groundwater analytical results are reported in ug/L.
If duplicates exist: (1) if the duplicate pair was both detects or both non-detects, the average of the duplicate results was used as a single data point; (2) if the duplicate pair contained a detect and a non-detect, the detected value was used.
If the dataset contains nondetects, summary statistics are estimated by the Kaplan-Meier (KM) method.
Summary statistics calculations are censored at the method detection limit (MDL).

Acronyms
% = percent
-- = no data
max = maximum
MDL = method detection limit
min = minimum
Std Dev = standard deviation
ug/l = microgram per liter

References

USEPA. 2015a. ProUCL Version 5.1.002 Technical Guide. Office of Research and Development, U.S. Environmental Protection Agency, Report No. EPA/600/R-07/041. October.
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USEPA. 2016. ProUCL Version 5.1.002 (Software). Retrieved from http://www.epa.gov/osp/hstl/tsc/software.htm. May.

Table 3
Limit of Quantitation (LOQ) Screen Results for Metals
Camp Hero Remedial Investigation
Montauk, New York

	Quantitation Limits, LOQ (Without Outlier CH-MW11)						Quantitation Limits, LOQ (All Locations)					
	Dissolved			Total			Dissolved			Total		
Analyte	Percent NDs (%)	Counts of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Counts of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Counts of Results Below LOQ	Percent Total Results < LOQ	Percent NDs (%)	Counts of Results Below LOQ	Percent Total Results < LOQ
aluminum	69%	12	92%	31%	10	77%	64%	12	86%	29%	10	71%
antimony	100%	13	100%	100%	13	100%	93%	14	100%	93%	14	100%
arsenic	92%	13	100%	77%	13	100%	86%	14	100%	71%	13	93%
barium	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
beryllium	92%	13	100%	85%	13	100%	86%	14	100%	79%	13	93%
cadmium	100%	13	100%	100%	13	100%	100%	14	100%	100%	14	100%
calcium (ca)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
chromium	77%	13	100%	69%	13	100%	71%	13	93%	64%	13	93%
chromium(iii), insoluble salts	100%	13	100%	77%	13	100%	93%	13	93%	71%	13	93%
chromium(vi)	54%	7	54%	38%	8	62%	50%	7	50%	36%	8	57%
cobalt	0%	4	31%	0%	5	38%	0%	4	29%	0%	5	36%
copper	31%	13	100%	69%	13	100%	29%	13	93%	64%	13	93%
iron (fe)	46%	10	77%	23%	7	54%	43%	10	71%	21%	7	50%
lead	92%	13	100%	62%	13	100%	86%	14	100%	57%	13	93%
magnesium (mg)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
manganese (mn)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
mercury	100%	13	100%	100%	13	100%	100%	14	100%	100%	14	100%
nickel	15%	11	85%	23%	11	85%	14%	11	79%	21%	11	79%
potassium (k)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
selenium	100%	13	100%	100%	13	100%	93%	14	100%	93%	14	100%
silver	100%	13	100%	100%	13	100%	100%	14	100%	100%	14	100%
sodium (na)	0%	0	0%	0%	0	0%	0%	0	0%	0%	0	0%
thallium	100%	13	100%	100%	13	100%	100%	14	100%	93%	14	100%
vanadium	31%	13	100%	8%	10	77%	29%	13	93%	7%	10	71%
zinc	77%	13	100%	46%	13	100%	71%	14	100%	43%	13	93%

Notes
All groundwater analytical results are reported in ug/L.
If duplicates exist: (1) if the duplicate pair was both detects or both non-detects, the average of the duplicate results was used as a single data point; (2) if the duplicate pair contained a detect and a non-detect, the detected value was used.

Acronyms
% = percent
LOQ = level of quantitation
ND = non-detect
ug/l = microgram per liter

Table 4
Monte Carlo Simulations for Metals in Groundwater
Camp Hero Remedial Investigation
Montauk, New York

	Percent Non-Detect		Goodness-of-Fit (Data Distribution)		t-Test	Permutation Test	Are the Means of East and West Basin GW Concentrations Equal?
	East Basin	West Basin	East Basin	West Basin	H_0 = The two samples are taken from populations with equal means	H_0 = The two samples are taken from populations with equal means	$p > 0.05$ accepts H_0
Analyte					p	p (Monte Carlo)[1]	
Dissolved Metals							
Aluminum	50%	86%			--	0.042	No
Antimony	100%	100%			--	--	--
Arsenic	100%	86%			--	--	--
Barium	0%	0%	N		--	0.362	Yes
Beryllium	83%	100%			--	--	--
Cadmium	100%	100%			--	--	--
Calcium (Ca)	0%	0%		N	--	0.173	Yes
Chromium	67%	86%			--	1.000	Yes
Chromium (III), Insoluble Salts	100%	100%			--	--	--
Chromium (VI)	50%	57%			--	0.882	Yes
Cobalt	0%	0%		N	--	0.120	Yes
Copper	17%	43%			--	0.231	Yes
Iron (Fe)	50%	43%			--	0.709	Yes
Lead	83%	100%			--	--	--
Magnesium (Mg)	0%	0%	N	N	0.055	0.056	Yes
Manganese (Mn)	0%	0%		N	--	0.999	Yes
Mercury	100%	100%			--	--	--
Nickel	17%	14%	N	N	0.145	0.172	Yes
Potassium (K)	0%	0%		N	--	0.479	Yes
Selenium	100%	100%			--	--	--
Silver	100%	100%			--	--	--
Sodium (Na)	0%	0%			--	0.674	Yes
Thallium	100%	100%			--	--	--
Vanadium	17%	43%	N	N	0.196	0.187	Yes
Zinc	83%	71%			--	0.729	Yes
Total Metals							
Aluminum	33%	29%			--	0.193	Yes
Antimony	100%	100%			--	--	--
Arsenic	83%	71%			--	0.854	Yes
Barium	0%	0%	N		--	0.489	Yes
Beryllium	67%	100%			--	--	--
Cadmium	100%	100%			--	--	--
Calcium (Ca)	0%	0%		N	--	0.202	Yes
Chromium	67%	71%			--	0.305	Yes
Chromium (III), Insoluble Salts	67%	86%			--	0.425	Yes
Chromium (VI)	17%	57%			--	0.821	Yes
Cobalt	0%	0%	N	N	0.138	0.137	Yes
Copper	50%	86%			--	0.161	Yes
Iron (Fe)	33%	14%			--	0.887	Yes
Lead	67%	57%			--	0.306	Yes
Magnesium (Mg)	0%	0%	N	N	0.098	0.099	Yes
Manganese (Mn)	0%	0%		N	--	0.979	Yes
Mercury	100%	100%			--	--	--
Nickel	33%	14%	N	N	0.229	0.227	Yes
Potassium (K)	0%	0%		N	--	0.682	Yes
Selenium	100%	100%			--	--	--
Silver	100%	100%			--	--	--
Sodium (Na)	0%	0%			--	0.686	Yes
Thallium	100%	100%			--	--	--
Vanadium	0%	14%		N	--	0.439	Yes
Zinc	50%	43%			--	0.686	Yes

Notes:
-- = Test not applicable
Data Distribution: N = Normal
H_0 = null hypothesis
[1] The default PAST setting, n = 9,999, was used to perform Monte Carlo Simulations

Table 5
BTV Summary Table for Groundwater (Without Outlier CH-MW11)
Camp Hero Remedial Investigation
Montauk, New York

Analyte	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness-of-Fit Test Results (5% Significance Level)	Upper Tolerance Limit (UTL)	Upper Prediction Limit (UPL)	Background Threshold Value (BTV)	
								UTL Method	UPL Method
Without Outlier CH-MW11 - Dissolved (ug/L)									
aluminum	13	69%	92%	338	normal	299.4	226.5	95% UTL 95% Coverage (KM)	95% KM UPL (t)
antimony	13	100%	100%	--	--	<0.48	<0.48	Sample LOD	Sample LOD
arsenic	13	92%	100%	1.1	--	<4	<4	Sample LOQ	Sample LOQ
barium	13	0%	0%	156	gamma	174.6	110.1	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
beryllium	13	92%	100%	0.26	--	<1	<1	Sample LOQ	Sample LOQ
cadmium	13	100%	100%	--	--	<0.19	<0.19	Sample LOD	Sample LOD
calcium (ca)	13	0%	0%	20500	normal	25218	20494	95% UTL with 95% Coverage	95% UPL (t)
chromium	13	77%	100%	0.96	--	<4	<4	Sample LOQ	Sample LOQ
chromium(iii), insoluble salts	13	100%	100%	--	--	<0.59	<0.59	Sample LOD	Sample LOD
chromium(vi)	13	54%	54%	0.56	normal	0.581	0.438	95% UTL 95% Coverage (KM)	95% KM UPL (t)
cobalt	13	0%	31%	6.2	normal	7.374	5.83	95% UTL with 95% Coverage	95% UPL (t)
copper	13	31%	100%	2.5	--	<4	<4	Sample LOQ	Sample LOQ
iron (fe)	13	46%	77%	33100	non-parametric	33100	33100	95% UTL with 95% Coverage (KM)	95% UPL
lead	13	92%	100%	0.12	--	<2	<2	Sample LOQ	Sample LOQ
magnesium (mg)	13	0%	0%	12700	normal	14270	11655	95% UTL with 95% Coverage	95% UPL (t)
manganese (mn)	13	0%	0%	1300	normal	1586	1236	95% UTL with 95% Coverage	95% UPL (t)
mercury	13	100%	100%	--	--	<0.05	<0.05	Sample LOD	Sample LOD
nickel	13	15%	85%	6.1	gamma	7.028	5.013	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
potassium (k)	13	0%	0%	3940	normal	4914	4052	95% UTL with 95% Coverage	95% UPL (t)
selenium	13	100%	100%	--	--	<0.44	<0.44	Sample LOD	Sample LOD
silver	13	100%	100%	--	--	<0.12	<0.12	Sample LOD	Sample LOD
sodium (na)	13	0%	0%	298000	lognormal	300488	139568	95% UTL with 95% Coverage	95% UPL (t)
thallium	13	100%	100%	--	--	<0.16	<0.16	Sample LOD	Sample LOD
vanadium	13	31%	100%	0.55	--	<1	<1	Sample LOQ	Sample LOQ
zinc	13	77%	100%	8	--	<30	<30	Sample LOQ	Sample LOQ
Without Outlier CH-MW11 - Total (ug/L)									
aluminum	13	31%	77%	1740	gamma	2210	1176	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
antimony	13	100%	100%	--	--	<0.48	<0.48	Sample LOD	Sample LOD
arsenic	13	77%	100%	1.2	--	<4	<4	Sample LOQ	Sample LOQ
barium	13	0%	0%	158	normal	146.4	113.4	95% UTL with 95% Coverage	95% UPL (t)
beryllium	13	85%	100%	0.13	--	<1	<1	Sample LOQ	Sample LOQ
cadmium	13	100%	100%	--	--	<0.19	<0.19	Sample LOD	Sample LOD
calcium (ca)	13	0%	0%	18900	normal	24833	20195	95% UTL with 95% Coverage	95% UPL (t)
chromium	13	69%	100%	3.7	--	<4	<4	Sample LOQ	Sample LOQ
chromium(iii), insoluble salts	13	77%	100%	3.7	--	<4	<4	Sample LOQ	Sample LOQ
chromium(vi)	13	38%	62%	0.555	gamma	0.791	0.444	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
cobalt	13	0%	38%	6.2	normal	7.679	6.025	95% UTL with 95% Coverage	95% UPL (t)
copper	13	69%	100%	2.4	--	<4	<4	Sample LOQ	Sample LOQ
iron (fe)	13	23%	54%	30000	non-parametric	30000	30000	95% UTL with 95% Coverage (KM)	95% UPL
lead	13	62%	100%	1.5	--	<2	<2	Sample LOQ	Sample LOQ
magnesium (mg)	13	0%	0%	11600	normal	13458	11012	95% UTL with 95% Coverage	95% UPL (t)
manganese (mn)	13	0%	0%	1380	normal	1571	1222	95% UTL with 95% Coverage	95% UPL (t)
mercury	13	100%	100%	--	--	<0.05	<0.05	Sample LOD	Sample LOD
nickel	13	23%	85%	4.7	normal	5.919	4.826	95% UTL 95% Coverage (KM)	95% KM UPL (t)
potassium (k)	13	0%	0%	4440	normal	4942	4055	95% UTL with 95% Coverage	95% UPL (t)
selenium	13	100%	100%	--	--	<0.44	<0.44	Sample LOD	Sample LOD
silver	13	100%	100%	--	--	<0.12	<0.12	Sample LOD	Sample LOD
sodium (na)	13	0%	0%	297000	lognormal	305812	138941	95% UTL with 95% Coverage	95% UPL (t)
thallium	13	100%	100%	--	--	<0.16	<0.16	Sample LOD	Sample LOD
vanadium	13	8%	77%	4.5	non-parametric	4.5	4.5	95% UTL with 95% Coverage (KM)	95% UPL
zinc	13	46%	100%	11.3	--	<30	<30	Sample LOQ	Sample LOQ

Table 5
BTV Summary Table for Groundwater (Without Outlier CH-MW11)
Camp Hero Remedial Investigation
Montauk, New York

Analyte	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness-of-Fit Test Results (5% Significance Level)	Background Threshold Value (BTV)			
						Upper Tolerance Limit (UTL)	Upper Prediction Limit (UPL)	UTL Method	UPL Method

Notes
All groundwater analytical results are reported in ug/L.
If duplicates exist: (1) if the duplicate pair was both detects or both non-detects, the average of the duplicate results was used as a single data point; (2) if the duplicate pair contained a detect and a non-detect, the detected value was used.
If the dataset contains nondetects, summary statistics and BTVs are estimated by the Kaplan-Meier (KM) or robust regression on order statistics (ROS) method.
BTV calculations are censored at the method detection limit (MDL), as the laboratory had reported detected results ("J") down to the MDL level. Although there may be uncertainties censoring at MDL, the statistical calculations are benefited by maintaining the proper rank-order and using the lowest censoring limit (Helsel 2005).
Goodness-of-Fit Test at 5% significance level is used to test for distributional assumption.
The distributional assumption from Goodness-of-Fit Test and the detection rate are used to select the appropriate BTV calculation method.

Acronyms
% = percent
-- = no data
BTV = background threshold value
LOD = level of detection
LOQ = level of quantitation
max = maximum
n = sample size
ND = non-detect
No. = number
ug/l = microgram per liter
UPL = upper prediction limit
UTL = upper tolerance limit

References
USEPA. 2015a. ProUCL Version 5.1.002 Technical Guide. Office of Research and Development, U.S. Environmental Protection Agency, Report No. EPA/600/R-07/041. October.
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Table 6
BTV Summary Table for Groundwater (All Locations)
Camp Hero Remedial Investigation
Montauk, New York

Analyte	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness-of-Fit Test Results (5% Significance Level)	Upper Tolerance Limit (UTL)	Upper Prediction Limit (UPL)	Background Threshold Value (BTV) UTL Method	Background Threshold Value (BTV) UPL Method
All Locations - Dissolved (ug/L)									
aluminum	14	64%	86%	2020	gamma	1825	804.3	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
antimony	14	93%	100%	1.9	--	<2	<2	Sample LOQ	Sample LOQ
arsenic	14	86%	100%	2.7	--	<4	<4	Sample LOQ	Sample LOQ
barium	14	0%	0%	156	normal	138.1	107.9	95% UTL with 95% Coverage	95% UPL (t)
beryllium	14	86%	100%	0.26	--	<1	<1	Sample LOQ	Sample LOQ
cadmium	14	100%	100%	--	--	<0.19	<0.19	Sample LOD	Sample LOD
calcium (ca)	14	0%	0%	20500	normal	24273	19958	95% UTL with 95% Coverage	95% UPL (t)
chromium	14	71%	93%	7.8	non-parametric	7.8	7.8	95% UTL with 95% Coverage	95% UPL
chromium(iii), insoluble salts	14	93%	93%	7.3	--	<4	<4	Sample LOQ	Sample LOQ
chromium(vi)	14	50%	50%	0.56	normal	0.644	0.494	95% UTL 95% Coverage (KM)	95% KM UPL (t)
cobalt	14	0%	29%	11.2	normal	10.76	8.439	95% UTL with 95% Coverage	95% UPL (t)
copper	14	29%	93%	39.2	non-parametric	39.2	39.2	95% UTL with 95% Coverage	95% UPL
iron (fe)	14	43%	71%	33100	non-parametric	33100	33100	95% UTL with 95% Coverage	95% UPL
lead	14	86%	100%	1.4	--	<2	<2	Sample LOQ	Sample LOQ
magnesium (mg)	14	0%	0%	12700	normal	13728	11313	95% UTL with 95% Coverage	95% UPL (t)
manganese (mn)	14	0%	0%	1300	normal	1583	1253	95% UTL with 95% Coverage	95% UPL (t)
mercury	14	100%	100%	--	--	<0.05	<0.05	Sample LOD	Sample LOD
nickel	14	14%	79%	11.6	lognormal	13.98	7.954	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
potassium (k)	14	0%	0%	3940	normal	4778	3987	95% UTL with 95% Coverage	95% UPL (t)
selenium	14	93%	100%	0.68	--	<4	<4	Sample LOQ	Sample LOQ
silver	14	100%	100%	--	--	<0.12	<0.12	Sample LOD	Sample LOD
sodium (na)	14	0%	0%	298000	lognormal	348414	163074	95% UTL with 95% Coverage	95% UPL (t)
thallium	14	100%	100%	--	--	<0.16	<0.16	Sample LOD	Sample LOD
vanadium	14	29%	93%	10.1	non-parametric	10.1	10.1	95% UTL with 95% Coverage	95% UPL
zinc	14	71%	100%	9.7	--	<30	<30	Sample LOQ	Sample LOQ
All Locations - Total (ug/L)									
aluminum	14	29%	71%	20500	gamma	12899	6244	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)
antimony	14	93%	100%	1.4	--	<2	<2	Sample LOQ	Sample LOQ
arsenic	14	71%	93%	7.8	gamma	6.683	3.178	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
barium	14	0%	0%	158	gamma	238	150.9	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
beryllium	14	79%	93%	1.1	normal	0.848	0.649	95% UTL 95% Coverage (KM)	95% KM UPL (t)
cadmium	14	100%	100%	--	--	<0.19	<0.19	Sample LOD	Sample LOD
calcium (ca)	14	0%	0%	18900	normal	24037	19793	95% UTL with 95% Coverage	95% UPL (t)
chromium	14	64%	93%	27.5	gamma	21.86	10.14	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
chromium(iii), insoluble salts	14	71%	93%	27	gamma	20.56	9.371	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
chromium(vi)	14	36%	57%	0.555	normal	0.602	0.463	95% UTL 95% Coverage (KM)	95% KM UPL (t)
cobalt	14	0%	36%	18.1	gamma	20.95	12.5	95% WH Approx. Gamma UTL with 95% Coverage	95% Wilson Hilferty (WH) Approx. Gamma UPL
copper	14	64%	93%	59.9	non-parametric	59.9	59.9	95% UTL with 95% Coverage	95% UPL
iron (fe)	14	21%	50%	30000	non-parametric	30000	30000	95% UTL with 95% Coverage	95% UPL
lead	14	57%	93%	10.5	gamma	8.561	4.111	95% Approx. Gamma UTL with 95% Coverage (ROS, WH)	95% Approx. Gamma UPL (ROS, WH)
magnesium (mg)	14	0%	0%	11600	normal	13171	10913	95% UTL with 95% Coverage	95% UPL (t)
manganese (mn)	14	0%	0%	1380	normal	1661	1310	95% UTL with 95% Coverage	95% UPL (t)
mercury	14	100%	100%	--	--	<0.05	<0.05	Sample LOD	Sample LOD
nickel	14	21%	79%	26.1	lognormal	24.68	12.26	95% KM UTL (Lognormal) 95% Coverage	95% KM UPL (Lognormal)
potassium (k)	14	0%	0%	5520	normal	5939	4853	95% UTL with 95% Coverage	95% UPL (t)
selenium	14	93%	100%	0.89	--	<4	<4	Sample LOQ	Sample LOQ
silver	14	100%	100%	--	--	<0.12	<0.12	Sample LOD	Sample LOD
sodium (na)	14	0%	0%	297000	lognormal	368631	167427	95% UTL with 95% Coverage	95% UPL (t)
thallium	14	93%	100%	0.27	--	<1	<1	Sample LOQ	Sample LOQ
vanadium	14	7%	71%	45.1	non-parametric	45.1	45.1	95% UTL with 95% Coverage	95% UPL
zinc	14	43%	93%	42.4	gamma	33.09	22	95% Approx. Gamma UTL with 95% Coverage (KM, WH)	95% Approx. Gamma UPL (KM, WH)

Table 6
BTV Summary Table for Groundwater (All Locations)
Camp Hero Remedial Investigation
Montauk, New York

Analyte	n	Percent NDs	Percent Total Results < LOQ	Max Detect	Goodness-of-Fit Test Results (5% Significance Level)	Background Threshold Value (BTV)			
						Upper Tolerance Limit (UTL)	Upper Prediction Limit (UPL)	UTL Method	UPL Method

Notes
All groundwater analytical results are reported in ug/L.
If duplicates exist: (1) if the duplicate pair was both detects or both non-detects, the average of the duplicate results was used as a single data point; (2) if the duplicate pair contained a detect and a non-detect, the detected value was used.
If the dataset contains nondetects, summary statistics and BTVs are estimated by the Kaplan-Meier (KM) or robust regression on order statistics (ROS) method.
BTV calculations are censored at the method detection limit (MDL), as the laboratory had reported detected results (“J”) down to the MDL level. Although there may be uncertainties censoring at MDL, the statistical calculations are benefited by maintaining the proper rank-order and using the lowest censoring limit (Helsel 2005).
Goodness-of-Fit Test at 5% significance level is used to test for distributional assumption.
The distributional assumption from Goodness-of-Fit Test and the detection rate are used to select the appropriate BTV calculation method.

Acronyms
% = percent
-- = no data
BTV = background threshold value
LOD = level of detection
LOQ = level of quantitation
max = maximum
n = sample size
ND = non-detect
No. = number
ug/l = microgram per liter
UPL = upper prediction limit
UTL = upper tolerance limit

References
USEPA. 2015a. ProUCL Version 5.1.002 Technical Guide. Office of Research and Development, U.S. Environmental Protection Agency, Report No. EPA/600/R-07/041. October.
USEPA. 2015b. ProUCL Version 5.1.002 User Guide. Office of Research and Development, U.S. Environmental Protection Agency, Report No. EPA/600/R-07/041. October.
USEPA. 2016. ProUCL Version 5.1.002 (Software). Retrieved from http://www.epa.gov/osp/hstl/tsc/software.htm. May.

Table 7
Selected Groundwater BTVs for Metals
Camp Hero Remedial Investigation
Montauk, New York

Analyte	Upper Tolerance Limit (UTL) Without Outlier CH-MW11 Dissolved	Total
aluminum	299.4	2210
antimony	<0.48	<0.48
arsenic	<4	<4
barium	174.6	146.4
beryllium	<1	<1
cadmium	<0.19	<0.19
calcium (ca)	25218	24833
chromium	<4	<4
chromium(iii), insoluble salts	<0.59	<4
chromium(vi)	0.581	0.791
cobalt	7.374	7.679
copper	<4	<4
iron (fe)	33100	30000
lead	<2	<2
magnesium (mg)	14270	13458
manganese (mn)	1586	1571
mercury	<0.05	<0.05
nickel	7.028	5.919
potassium (k)	4914	4942
selenium	<0.44	<0.44
silver	<0.12	<0.12
sodium (na)	300488	305812
thallium	<0.16	<0.16
vanadium	<1	4.5
zinc	<30	<30

Notes
All groundwater analytical results are reported in ug/L.
Acronyms
BTV = background threshold value
ug/l = microgram per liter
UTL = upper tolerance limit

Attachment E

ProUCL BTV Output Files

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ProUCL Output - UTL/UPL
(version 5.1.002)

Background Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.12/15/2017 2:53:19 PM
From File	ProUCL_Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Observations	1
Number of Bootstrap Operations	2000

CONC (|7429-90-5|ug/l|without_mw11|metals|sw6020a|aluminum|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	5		
Number of Detects	4	Number of Non-Detects	9
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	26.4	Minimum Non-Detect	23.1
Maximum Detect	338	Maximum Non-Detect	23.1
Variance Detected	18924	Percent Non-Detects	69.23%
Mean Detected	151.2	SD Detected	137.6
Mean of Detected Logged Data	4.628	SD of Detected Logged Data	1.098

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	62.52	KM SD	88.67
95% UTL95% Coverage	299.4	95% KM UPL (t)	226.5
90% KM Percentile (z)	176.2	95% KM Percentile (z)	208.4
99% KM Percentile (z)	268.8	95% KM USL	269.2

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	54.52	SD	96.08
95% UTL95% Coverage	311.2	95% UPL (t)	232.2
90% Percentile (z)	177.7	95% Percentile (z)	212.6
99% Percentile (z)	278	95% USL	278.4

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.2	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.663	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.4	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.422	k star (bias corrected MLE)	0.522
Theta hat (MLE)	106.3	Theta star (bias corrected MLE)	289.5
nu hat (MLE)	11.38	nu star (bias corrected)	4.178
MLE Mean (bias corrected)	151.2		
MLE Sd (bias corrected)	209.2	95% Percentile of Chisquare (2kstar)	3.951

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	46.53
Maximum	338	Median	0.01
SD	100	CV	2.15
k hat (MLE)	0.139	k star (bias corrected MLE)	0.158
Theta hat (MLE)	335.5	Theta star (bias corrected MLE)	294.6
nu hat (MLE)	3.606	nu star (bias corrected)	4.107
MLE Mean (bias corrected)	46.53	MLE Sd (bias corrected)	117.1
95% Percentile of Chisquare (2kstar)	1.721	90% Percentile	138.9
95% Percentile	253.4	99% Percentile	582.5

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	532.2	724.1	95% Approx. Gamma UPL	229.5	248.1
95% Gamma USL	386.2	480.7			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	62.52	SD (KM)	88.67
Variance (KM)	7863	SE of Mean (KM)	28.4
k hat (KM)	0.497	k star (KM)	0.434
nu hat (KM)	12.92	nu star (KM)	11.27
theta hat (KM)	125.8	theta star (KM)	144.2
80% gamma percentile (KM)	101.7	90% gamma percentile (KM)	174
95% gamma percentile (KM)	252.5	99% gamma percentile (KM)	448.5

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	320.7	328.5	95% Approx. Gamma UPL	196.2	192.3
95% KM Gamma Percentile	171.2	166.3	95% Gamma USL	264.2	265.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.989	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean in Original Scale	48.63	Mean in Log Scale	1.537
SD in Original Scale	99.02	SD in Log Scale	2.618
95% UTL95% Coverage	5066	95% BCA UTL95% Coverage	338
95% Bootstrap (%) UTL95% Coverage	338	95% UPL (t)	589.7
90% Percentile (z)	133.3	95% Percentile (z)	345
99% Percentile (z)	2055	95% USL	2077

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	3.598	95% KM UTL (Lognormal)95% Coverage	368.7
KM SD of Logged Data	0.866	95% KM UPL (Lognormal)	181.1
95% KM Percentile Lognormal (z)	151.6	95% KM USL (Lognormal)	274.6

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	54.52	Mean in Log Scale	3.118
SD in Original Scale	96.08	SD in Log Scale	1.183
95% UTL95% Coverage	532	95% UPL (t)	201.4
90% Percentile (z)	102.9	95% Percentile (z)	158.1
99% Percentile (z)	353.9	95% USL	355.7

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	338
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	338
95% USL	338	95% KM Chebyshev UPL	463.6

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7429-90-5|ug/l|without_mw11|metals|sw6020a|aluminum|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	10		
Number of Detects	9	Number of Non-Detects	4
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	26.7	Minimum Non-Detect	23.1
Maximum Detect	1740	Maximum Non-Detect	23.1
Variance Detected	379928	Percent Non-Detects	30.77%
Mean Detected	417	SD Detected	616.4
Mean of Detected Logged Data	4.949	SD of Detected Logged Data	1.608

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

ProUCL Output - UTL/UPL

(version 5.1.002)

Shapiro Wilk Test Statistic	0.703	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	295.8	KM SD	516.6
95% UTL95% Coverage	1676	95% KM UPL (t)	1251
90% KM Percentile (z)	957.8	95% KM Percentile (z)	1145
99% KM Percentile (z)	1498	95% KM USL	1500

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	292.2	SD	539.6
95% UTL95% Coverage	1734	95% UPL (t)	1290
90% Percentile (z)	983.8	95% Percentile (z)	1180
99% Percentile (z)	1548	95% USL	1550

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.635	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.293	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.574	k star (bias corrected MLE)	0.456
Theta hat (MLE)	727	Theta star (bias corrected MLE)	913.5
nu hat (MLE)	10.32	nu star (bias corrected)	8.216
MLE Mean (bias corrected)	417		
MLE Sd (bias corrected)	617.2	95% Percentile of Chisquare (2kstar)	3.622

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	288.7
Maximum	1740	Median	32.5
SD	541.7	CV	1.876
k hat (MLE)	0.201	k star (bias corrected MLE)	0.206
Theta hat (MLE)	1436	Theta star (bias corrected MLE)	1402
nu hat (MLE)	5.229	nu star (bias corrected)	5.355
MLE Mean (bias corrected)	288.7	MLE Sd (bias corrected)	636.1
95% Percentile of Chisquare (2kstar)	2.106	90% Percentile	873.1
95% Percentile	1476	99% Percentile	3128

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3100	4549	95% Approx. Gamma UPL	1475	1793

95% Gamma USL	2329	3174

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	295.8	SD (KM)	516.6
Variance (KM)	266849	SE of Mean (KM)	152
k hat (KM)	0.328	k star (KM)	0.303
nu hat (KM)	8.524	nu star (KM)	7.89
theta hat (KM)	902.2	theta star (KM)	974.6
80% gamma percentile (KM)	454.9	90% gamma percentile (KM)	871.2
95% gamma percentile (KM)	1348	99% gamma percentile (KM)	2586

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2210	2450	95% Approx. Gamma UPL	1176	1187
95% KM Gamma Percentile	981.6	968.9	95% Gamma USL	1728	1843

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	289.7	Mean in Log Scale	3.689
SD in Original Scale	541.1	SD in Log Scale	2.415
95% UTL95% Coverage	25342	95% BCA UTL95% Coverage	1740
95% Bootstrap (%) UTL95% Coverage	1740	95% UPL (t)	3485
90% Percentile (z)	883.8	95% Percentile (z)	2125
99% Percentile (z)	11023	95% USL	11135

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	4.392	95% KM UTL (Lognormal)95% Coverage	4596
KM SD of Logged Data	1.513	95% KM UPL (Lognormal)	1326
95% KM Percentile Lognormal (z)	973.1	95% KM USL (Lognormal)	2746

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	292.2	Mean in Log Scale	4.179
SD in Original Scale	539.6	SD in Log Scale	1.78
95% UTL95% Coverage	7582	95% UPL (t)	1757
90% Percentile (z)	639.1	95% Percentile (z)	1220
99% Percentile (z)	4105	95% USL	4136

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	1740
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	1740

ProUCL Output - UTL/UPL
(version 5.1.002)

95% USL	1740	95% KM Chebyshev UPL	2632

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7429-90-5|ug/l|all_locations|metals|sw6020a|aluminum|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	6		
Number of Detects	5	Number of Non-Detects	9
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	26.4	Minimum Non-Detect	23.1
Maximum Detect	2020	Maximum Non-Detect	23.1
Variance Detected	712676	Percent Non-Detects	64.29%
Mean Detected	525	SD Detected	844.2
Mean of Detected Logged Data	5.224	SD of Detected Logged Data	1.638

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.677	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.388	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	202.3	KM SD	511.3
95% UTL95% Coverage	1539	95% KM UPL (t)	1140
90% KM Percentile (z)	857.6	95% KM Percentile (z)	1043
99% KM Percentile (z)	1392	95% KM USL	1415

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	194.9	SD	533.3
95% UTL95% Coverage	1589	95% UPL (t)	1173
90% Percentile (z)	878.4	95% Percentile (z)	1072
99% Percentile (z)	1436	95% USL	1460

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.36	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.706	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.248	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.37	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.595	k star (bias corrected MLE)	0.371
Theta hat (MLE)	881.8	Theta star (bias corrected MLE)	1413
nu hat (MLE)	5.953	nu star (bias corrected)	3.715
MLE Mean (bias corrected)	525		
MLE Sd (bias corrected)	861.3	95% Percentile of Chisquare (2kstar)	3.166

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	187.5
Maximum	2020	Median	0.01
SD	536.1	CV	2.859
k hat (MLE)	0.125	k star (bias corrected MLE)	0.146
Theta hat (MLE)	1504	Theta star (bias corrected MLE)	1288
nu hat (MLE)	3.491	nu star (bias corrected)	4.076
MLE Mean (bias corrected)	187.5	MLE Sd (bias corrected)	491.4
95% Percentile of Chisquare (2kstar)	1.612	90% Percentile	553.5
95% Percentile	1038	99% Percentile	2452

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1825	2344	95% Approx. Gamma UPL	804.3	826.7
95% Gamma USL	1448	1745			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	202.3	SD (KM)	511.3
Variance (KM)	261447	SE of Mean (KM)	152.8
k hat (KM)	0.157	k star (KM)	0.171
nu hat (KM)	4.384	nu star (KM)	4.778
theta hat (KM)	1292	theta star (KM)	1186
80% gamma percentile (KM)	242.5	90% gamma percentile (KM)	608.2
95% gamma percentile (KM)	1084	99% gamma percentile (KM)	2429

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1357	1364	95% Approx. Gamma UPL	728.7	679
95% KM Gamma Percentile	614	562.6	95% Gamma USL	1134	1112

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	188.6	Mean in Log Scale	1.288
SD in Original Scale	535.7	SD in Log Scale	3.646

95% UTL95% Coverage	49955	95% BCA UTL95% Coverage	2020
95% Bootstrap (%) UTL95% Coverage	2020	95% UPL (t)	2897
90% Percentile (z)	387.8	95% Percentile (z)	1458
99% Percentile (z)	17501	95% USL	20645

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	3.884	95% KM UTL (Lognormal)95% Coverage	1566
KM SD of Logged Data	1.328	95% KM UPL (Lognormal)	555
95% KM Percentile Lognormal (z)	432.3	95% KM USL (Lognormal)	1135

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	194.9	Mean in Log Scale	3.439
SD in Original Scale	533.3	SD in Log Scale	1.653
95% UTL95% Coverage	2345	95% UPL (t)	645
90% Percentile (z)	259.1	95% Percentile (z)	472.5
99% Percentile (z)	1458	95% USL	1571

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	2020
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2020
95% USL	2020	95% KM Chebyshev UPL	2509

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7429-90-5|ug/l|all_locations|metals|sw6020a|aluminum|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	11		
Number of Detects	10	Number of Non-Detects	4
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	26.7	Minimum Non-Detect	23.1
Maximum Detect	20500	Maximum Non-Detect	23.1
Variance Detected	40670492	Percent Non-Detects	28.57%
Mean Detected	2425	SD Detected	6377
Mean of Detected Logged Data	5.446	SD of Detected Logged Data	2.186

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.434	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Lilliefors Test Statistic	0.443	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1739	KM SD	5227
95% UTL95% Coverage	15403	95% KM UPL (t)	11321
90% KM Percentile (z)	8438	95% KM Percentile (z)	10337
99% KM Percentile (z)	13899	95% KM USL	14136

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	1736	SD	5426
95% UTL95% Coverage	15918	95% UPL (t)	11681
90% Percentile (z)	8689	95% Percentile (z)	10660
99% Percentile (z)	14357	95% USL	14603

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.078	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.816	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.253	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.288	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.295	k star (bias corrected MLE)	0.273
Theta hat (MLE)	8231	Theta star (bias corrected MLE)	8886
nu hat (MLE)	5.893	nu star (bias corrected)	5.458
MLE Mean (bias corrected)	2425		
MLE Sd (bias corrected)	4642	95% Percentile of Chisquare (2kstar)	2.573

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1732
Maximum	20500	Median	35.55
SD	5427	CV	3.133
k hat (MLE)	0.156	k star (bias corrected MLE)	0.171
Theta hat (MLE)	11073	Theta star (bias corrected MLE)	10158
nu hat (MLE)	4.38	nu star (bias corrected)	4.775
MLE Mean (bias corrected)	1732	MLE Sd (bias corrected)	4195
95% Percentile of Chisquare (2kstar)	1.827	90% Percentile	5207
95% Percentile	9280	99% Percentile	20808

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	15178	18493	95% Approx. Gamma UPL	6975	7080
95% Gamma USL	12175	14059			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1739	SD (KM)	5227
Variance (KM)	27322963	SE of Mean (KM)	1473
k hat (KM)	0.111	k star (KM)	0.135
nu hat (KM)	3.099	nu star (KM)	3.768
theta hat (KM)	15712	theta star (KM)	12922
80% gamma percentile (KM)	1719	90% gamma percentile (KM)	5063
95% gamma percentile (KM)	9759	99% gamma percentile (KM)	23708

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	12899	13313	95% Approx. Gamma UPL	6244	5697
95% KM Gamma Percentile	5089	4506	95% Gamma USL	10487	10424

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	1733	Mean in Log Scale	3.884
SD in Original Scale	5427	SD in Log Scale	3.201
95% UTL95% Coverage	209585	95% BCA UTL95% Coverage	20500
95% Bootstrap (%) UTL95% Coverage	20500	95% UPL (t)	17203
90% Percentile (z)	2943	95% Percentile (z)	9417
99% Percentile (z)	83449	95% USL	96474

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	4.787	95% KM UTL (Lognormal)95% Coverage	24780
KM SD of Logged Data	2.039	95% KM UPL (Lognormal)	5041
95% KM Percentile Lognormal (z)	3434	95% KM USL (Lognormal)	15117

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	1736	Mean in Log Scale	4.589
SD in Original Scale	5426	SD in Log Scale	2.299
95% UTL95% Coverage	40116	95% UPL (t)	6661
90% Percentile (z)	1874	95% Percentile (z)	4321
99% Percentile (z)	20706	95% USL	22979

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	20500
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	20500
95% USL	20500	95% KM Chebyshev UPL	25323

ProUCL Output - UTL/UPL
(version 5.1.002)

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-36-0|ug/l|without_mw11|metals|sw6020a|antimony|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.48
Maximum Detect	N/A	Maximum Non-Detect	0.48
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-36-0|ug/l|without_mw11|metals|sw6020a|antimony|d|) was not processed!

CONC (|7440-36-0|ug/l|without_mw11|metals|sw6020a|antimony|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.48
Maximum Detect	N/A	Maximum Non-Detect	0.48
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-36-0|ug/l|without_mw11|metals|sw6020a|antimony|t|) was not processed!

CONC (|7440-36-0|ug/l|all_locations|metals|sw6020a|antimony|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	13

Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	1.9	Minimum Non-Detect	0.48
Maximum Detect	1.9	Maximum Non-Detect	0.48
Variance Detected	N/A	Percent Non-Detects	92.86%
Mean Detected	1.9	SD Detected	N/A
Mean of Detected Logged Data	0.642	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-36-0|ug/l|all_locations|metals|sw6020a|antimony|d|) was not processed!

CONC (|7440-36-0|ug/l|all_locations|metals|sw6020a|antimony|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	1.4	Minimum Non-Detect	0.48
Maximum Detect	1.4	Maximum Non-Detect	0.48
Variance Detected	N/A	Percent Non-Detects	92.86%
Mean Detected	1.4	SD Detected	N/A
Mean of Detected Logged Data	0.336	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-36-0|ug/l|all_locations|metals|sw6020a|antimony|t|) was not processed!

CONC (|7440-38-2|ug/l|without_mw11|metals|sw6020a|arsenic|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	12
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	0.68
Maximum Detect	1.1	Maximum Non-Detect	0.68
Variance Detected	N/A	Percent Non-Detects	92.31%
Mean Detected	1.1	SD Detected	N/A
Mean of Detected Logged Data	0.0953	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-38-2|ug/l|without_mw11|metals|sw6020a|arsenic|d|) was not processed!

CONC (|7440-38-2|ug/l|without_mw11|metals|sw6020a|arsenic|t|)

ProUCL Output - UTL/UPL
(version 5.1.002)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	4		
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.72	Minimum Non-Detect	0.68
Maximum Detect	1.2	Maximum Non-Detect	0.68
Variance Detected	0.0752	Percent Non-Detects	76.92%
Mean Detected	0.883	SD Detected	0.274
Mean of Detected Logged Data	-0.154	SD of Detected Logged Data	0.291

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.766	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.727	KM SD	0.138
95% UTL95% Coverage	1.094	95% KM UPL (t)	0.981
90% KM Percentile (z)	0.903	95% KM Percentile (z)	0.953
99% KM Percentile (z)	1.047	95% KM USL	1.047

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.465	SD	0.263
95% UTL95% Coverage	1.169	95% UPL (t)	0.952
90% Percentile (z)	0.803	95% Percentile (z)	0.898
99% Percentile (z)	1.078	95% USL	1.079

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	17.07	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0518	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	102.4	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.257
Maximum	1.2	Median	0.01
SD	0.387	CV	1.505
k hat (MLE)	0.419	k star (bias corrected MLE)	0.374
Theta hat (MLE)	0.613	Theta star (bias corrected MLE)	0.687
nu hat (MLE)	10.9	nu star (bias corrected)	9.721
MLE Mean (bias corrected)	0.257	MLE Sd (bias corrected)	0.42
95% Percentile of Chisquare (2kstar)	3.18	90% Percentile	0.734
95% Percentile	1.093	99% Percentile	2.001

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.332	2.875	95% Approx. Gamma UPL	1.198	1.306
95% Gamma USL	1.801	2.112			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.727	SD (KM)	0.138
Variance (KM)	0.0189	SE of Mean (KM)	0.0467
k hat (KM)	27.94	k star (KM)	21.54
nu hat (KM)	726.4	nu star (KM)	560.1
theta hat (KM)	0.026	theta star (KM)	0.0337
80% gamma percentile (KM)	0.854	90% gamma percentile (KM)	0.933
95% gamma percentile (KM)	1.002	99% gamma percentile (KM)	1.14

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.08	1.078	95% Approx. Gamma UPL	0.959	0.956
95% KM Gamma Percentile	0.93	0.927	95% Gamma USL	1.028	1.026

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.397	Mean in Log Scale	-1.191
SD in Original Scale	0.318	SD in Log Scale	0.763
95% UTL95% Coverage	2.334	95% BCA UTL95% Coverage	1.2
95% Bootstrap (%) UTL95% Coverage	1.2	95% UPL (t)	1.247
90% Percentile (z)	0.808	95% Percentile (z)	1.066
99% Percentile (z)	1.794	95% USL	1.8

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.332	95% KM UTL (Lognormal)95% Coverage	1.072
KM SD of Logged Data	0.15	95% KM UPL (Lognormal)	0.947
95% KM Percentile Lognormal (z)	0.919	95% KM USL (Lognormal)	1.018

ProUCL Output - UTL/UPL
(version 5.1.002)

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.465	Mean in Log Scale	-0.865
SD in Original Scale	0.263	SD in Log Scale	0.423
95% UTL95% Coverage	1.302	95% UPL (t)	0.92
90% Percentile (z)	0.724	95% Percentile (z)	0.844
99% Percentile (z)	1.125	95% USL	1.127

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	1.2
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	1.2
95% USL	1.2	95% KM Chebyshev UPL	1.349

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-38-2|ug/l|all_locations|metals|sw6020a|arsenic|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	0.68
Maximum Detect	2.7	Maximum Non-Detect	0.68
Variance Detected	1.28	Percent Non-Detects	85.71%
Mean Detected	1.9	SD Detected	1.131
Mean of Detected Logged Data	0.544	SD of Detected Logged Data	0.635

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.854	KM SD	0.523
95% UTL95% Coverage	2.222	95% KM UPL (t)	1.813
90% KM Percentile (z)	1.525	95% KM Percentile (z)	1.715
99% KM Percentile (z)	2.071	95% KM USL	2.095

ProUCL Output - UTL/UPL
(version 5.1.002)

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.563	SD	0.648
95% UTL95% Coverage	2.256	95% UPL (t)	1.75
90% Percentile (z)	1.393	95% Percentile (z)	1.628
99% Percentile (z)	2.069	95% USL	2.099

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	5.285	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.359	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	21.14	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.854	SD (KM)	0.523
Variance (KM)	0.274	SE of Mean (KM)	0.198
k hat (KM)	2.667	k star (KM)	2.143
nu hat (KM)	74.67	nu star (KM)	60
theta hat (KM)	0.32	theta star (KM)	0.399
80% gamma percentile (KM)	1.269	90% gamma percentile (KM)	1.635
95% gamma percentile (KM)	1.983	99% gamma percentile (KM)	2.752

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.096	2.079	95% Approx. Gamma UPL	1.619	1.595
95% KM Gamma Percentile	1.517	1.492	95% Gamma USL	1.939	1.918

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.331	Mean in Log Scale	-3.142
SD in Original Scale	0.74	SD in Log Scale	2.263
95% UTL95% Coverage	16	95% BCA UTL95% Coverage	2.7
95% Bootstrap (%) UTL95% Coverage	2.7	95% UPL (t)	2.734
90% Percentile (z)	0.785	95% Percentile (z)	1.785
99% Percentile (z)	8.346	95% USL	9.247

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.253	95% KM UTL (Lognormal)95% Coverage	2.027
KM SD of Logged Data	0.367	95% KM UPL (Lognormal)	1.522
95% KM Percentile Lognormal (z)	1.42	95% KM USL (Lognormal)	1.854

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.563	Mean in Log Scale	-0.847
SD in Original Scale	0.648	SD in Log Scale	0.615

95% UTL95% Coverage	2.141	95% UPL (t)	1.324
90% Percentile (z)	0.943	95% Percentile (z)	1.179
99% Percentile (z)	1.793	95% USL	1.844

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	2.7
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2.7
95% USL	2.7	95% KM Chebyshev UPL	3.215

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-38-2|ug/l|all_locations|metals|sw6020a|arsenic|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	5		
Number of Detects	4	Number of Non-Detects	10
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.72	Minimum Non-Detect	0.68
Maximum Detect	7.8	Maximum Non-Detect	0.68
Variance Detected	12.01	Percent Non-Detects	71.43%
Mean Detected	2.613	SD Detected	3.466
Mean of Detected Logged Data	0.398	SD of Detected Logged Data	1.129

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.678	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.408	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.232	KM SD	1.826
95% UTL95% Coverage	6.006	95% KM UPL (t)	4.58
90% KM Percentile (z)	3.573	95% KM Percentile (z)	4.236
99% KM Percentile (z)	5.481	95% KM USL	5.564

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.989	SD	1.977
95% UTL95% Coverage	6.156	95% UPL (t)	4.612

90% Percentile (z)	3.522	95% Percentile (z)	4.24
99% Percentile (z)	5.587	95% USL	5.677

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.692	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.666	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.386	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.402	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.024	k star (bias corrected MLE)	0.423
Theta hat (MLE)	2.551	Theta star (bias corrected MLE)	6.18
nu hat (MLE)	8.194	nu star (bias corrected)	3.382
MLE Mean (bias corrected)	2.613		
MLE Sd (bias corrected)	4.018	95% Percentile of Chisquare (2kstar)	3.446

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.754
Maximum	7.8	Median	0.01
SD	2.064	CV	2.739
k hat (MLE)	0.246	k star (bias corrected MLE)	0.241
Theta hat (MLE)	3.061	Theta star (bias corrected MLE)	3.126
nu hat (MLE)	6.893	nu star (bias corrected)	6.749
MLE Mean (bias corrected)	0.754	MLE Sd (bias corrected)	1.535
95% Percentile of Chisquare (2kstar)	2.359	90% Percentile	2.267
95% Percentile	3.687	99% Percentile	7.486

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	6.683	7.557	95% Approx. Gamma UPL	3.178	3.106
95% Gamma USL	5.409	5.854			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.232	SD (KM)	1.826
Variance (KM)	3.336	SE of Mean (KM)	0.564
k hat (KM)	0.455	k star (KM)	0.405
nu hat (KM)	12.74	nu star (KM)	11.35
theta hat (KM)	2.707	theta star (KM)	3.041
80% gamma percentile (KM)	1.992	90% gamma percentile (KM)	3.472
95% gamma percentile (KM)	5.097	99% gamma percentile (KM)	9.176

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	5.051	4.902	95% Approx. Gamma UPL	3.336	3.173

95% KM Gamma Percentile	2.991	2.835	95% Gamma USL	4.468	4.304

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.774	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.326	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.778	Mean in Log Scale	-2.848
SD in Original Scale	2.055	SD in Log Scale	2.65
95% UTL95% Coverage	59.02	95% BCA UTL95% Coverage	7.8
95% Bootstrap (%) UTL95% Coverage	7.8	95% UPL (t)	7.454
90% Percentile (z)	1.729	95% Percentile (z)	4.527
99% Percentile (z)	27.54	95% USL	31.05

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.162	95% KM UTL (Lognormal)95% Coverage	4.432
KM SD of Logged Data	0.631	95% KM UPL (Lognormal)	2.707
95% KM Percentile Lognormal (z)	2.403	95% KM USL (Lognormal)	3.803

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.989	Mean in Log Scale	-0.657
SD in Original Scale	1.977	SD in Log Scale	0.88
95% UTL95% Coverage	5.169	95% UPL (t)	2.6
90% Percentile (z)	1.601	95% Percentile (z)	2.204
99% Percentile (z)	4.013	95% USL	4.176

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	7.8
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	7.8
95% USL	7.8	95% KM Chebyshev UPL	9.473

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-39-3|ug/l|without_mw11|metals|sw6020a|barium|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	5.6	First Quartile	14.7
Second Largest	58.8	Median	22
Maximum	156	Third Quartile	40.7

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean	35.6	SD	39.85
Coefficient of Variation	1.12	Skewness	2.6
Mean of logged Data	3.161	SD of logged Data	0.917

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.687	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	142	90% Percentile (z)	86.67
95% UPL (t)	109.3	95% Percentile (z)	101.1
95% USL	128.5	99% Percentile (z)	128.3

Gamma GOF Test

A-D Test Statistic	0.398	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.242	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.358	k star (bias corrected MLE)	1.096
Theta hat (MLE)	26.21	Theta star (bias corrected MLE)	32.48
nu hat (MLE)	35.3	nu star (bias corrected)	28.49
MLE Mean (bias corrected)	35.6	MLE Sd (bias corrected)	34

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	110.1	90% Percentile	80.13
95% Hawkins Wixley (HW) Approx. Gamma UPL	112.6	95% Percentile	103.3
95% WH Approx. Gamma UTL with 95% Coverage	174.6	99% Percentile	156.6
95% HW Approx. Gamma UTL with 95% Coverage	187.5		
95% WH USL	145.5	95% HW USL	153

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	273.5	90% Percentile (z)	76.45
95% UPL (t)	128.7	95% Percentile (z)	106.7
95% USL	200.2	99% Percentile (z)	199.4

Nonparametric Distribution Free Background Statistics

ProUCL Output - UTL/UPL
(version 5.1.002)

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	156
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	156	95% BCA Bootstrap UTL with 95% Coverage	156
95% UPL	156	90% Percentile	57.26
90% Chebyshev UPL	159.7	95% Percentile	97.68
95% Chebyshev UPL	215.9	99% Percentile	144.3
95% USL	156		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-39-3|ug/l|without_mw11|metals|sw6020a|barium|t|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	6.1	First Quartile	18.4
Second Largest	59.6	Median	26.4
Maximum	158	Third Quartile	48.5
Mean	38.98	SD	40.22
Coefficient of Variation	1.032	Skewness	2.406
Mean of logged Data	3.278	SD of logged Data	0.911

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.726	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	146.4	90% Percentile (z)	90.52
95% UPL (t)	113.4	95% Percentile (z)	105.1
95% USL	132.7	99% Percentile (z)	132.5

Gamma GOF Test

A-D Test Statistic	0.324	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.142	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.443	k star (bias corrected MLE)	1.161
Theta hat (MLE)	27.02	Theta star (bias corrected MLE)	33.57
nu hat (MLE)	37.51	nu star (bias corrected)	30.18
MLE Mean (bias corrected)	38.98	MLE Sd (bias corrected)	36.17

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	118.4	90% Percentile	86.5
95% Hawkins Wixley (HW) Approx. Gamma UPL	121.9	95% Percentile	110.8
95% WH Approx. Gamma UTL with 95% Coverage	186.1	99% Percentile	166.7
95% HW Approx. Gamma UTL with 95% Coverage	201.2		
95% WH USL	155.6	95% HW USL	164.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	302	90% Percentile (z)	85.21
95% UPL (t)	142.9	95% Percentile (z)	118.6
95% USL	221.5	99% Percentile (z)	220.7

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	158
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	158	95% BCA Bootstrap UTL with 95% Coverage	158
95% UPL	158	90% Percentile	59.58
90% Chebyshev UPL	164.2	95% Percentile	98.96
95% Chebyshev UPL	220.9	99% Percentile	146.2
95% USL	158		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-39-3|ug/l|all_locations|metals|sw6020a|barium|d|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	5.6	First Quartile	15.53
Second Largest	58.8	Median	22.05
Maximum	156	Third Quartile	48.5
Mean	37.03	SD	38.66
Coefficient of Variation	1.044	Skewness	2.478

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean of logged Data	3.222	SD of logged Data	0.911

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.717	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	138.1	90% Percentile (z)	86.57
95% UPL (t)	107.9	95% Percentile (z)	100.6
95% USL	128.7	99% Percentile (z)	127

Gamma GOF Test

A-D Test Statistic	0.344	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.233	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.427	k star (bias corrected MLE)	1.169
Theta hat (MLE)	25.94	Theta star (bias corrected MLE)	31.67
nu hat (MLE)	39.97	nu star (bias corrected)	32.74
MLE Mean (bias corrected)	37.03	MLE Sd (bias corrected)	34.24

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	111.4	90% Percentile	82.03
95% Hawkins Wixley (HW) Approx. Gamma UPL	114.5	95% Percentile	105
95% WH Approx. Gamma UTL with 95% Coverage	171.8	99% Percentile	157.8
95% HW Approx. Gamma UTL with 95% Coverage	184.9		
95% WH USL	151.2	95% HW USL	160.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	271.2	90% Percentile (z)	80.58
95% UPL (t)	133.2	95% Percentile (z)	112.2
95% USL	217.5	99% Percentile (z)	208.7

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	156
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	156	95% BCA Bootstrap UTL with 95% Coverage	156
95% UPL	156	90% Percentile	57.84
90% Chebyshev UPL	157.1	95% Percentile	92.82
95% Chebyshev UPL	211.5	99% Percentile	143.4
95% USL	156		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-39-3|ug/l|all_locations|metals|sw6020a|barium|t|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
Minimum	6.1	First Quartile	18.58
Second Largest	158	Median	27.5
Maximum	158	Third Quartile	56.75
Mean	47.48	SD	50.05
Coefficient of Variation	1.054	Skewness	1.744
Mean of logged Data	3.405	SD of logged Data	0.997

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.733	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	178.3	90% Percentile (z)	111.6
95% UPL (t)	139.2	95% Percentile (z)	129.8
95% USL	166.2	99% Percentile (z)	163.9

Gamma GOF Test

A-D Test Statistic	0.459	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.234	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.239	k star (bias corrected MLE)	1.021
Theta hat (MLE)	38.31	Theta star (bias corrected MLE)	46.49

nu hat (MLE)	34.7	nu star (bias corrected)	28.6
MLE Mean (bias corrected)	47.48	MLE Sd (bias corrected)	46.98

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	150.9	90% Percentile	108.8
95% Hawkins Wixley (HW) Approx. Gamma UPL	156.1	95% Percentile	141.2
95% WH Approx. Gamma UTL with 95% Coverage	238	99% Percentile	216.3
95% HW Approx. Gamma UTL with 95% Coverage	259.4		
95% WH USL	208.1	95% HW USL	223.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.104	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	407.7	90% Percentile (z)	108
95% UPL (t)	187.2	95% Percentile (z)	155.2
95% USL	320.2	99% Percentile (z)	306.1

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	158
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	158	95% BCA Bootstrap UTL with 95% Coverage	158
95% UPL	158	90% Percentile	128.5
90% Chebyshev UPL	202.9	95% Percentile	158
95% Chebyshev UPL	273.3	99% Percentile	158
95% USL	158		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-41-7|ug/l|without_mw11|metals|sw6020a|beryllium|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	12
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	0.26	Minimum Non-Detect	0.11
Maximum Detect	0.26	Maximum Non-Detect	0.11
Variance Detected	N/A	Percent Non-Detects	92.31%
Mean Detected	0.26	SD Detected	N/A

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean of Detected Logged Data	-1.347	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-41-7|ug/l|without_mw11|metals|sw6020a|beryllium|d|) was not processed!

CONC (|7440-41-7|ug/l|without_mw11|metals|sw6020a|beryllium|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	2	Number of Non-Detects	11
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	0.11
Maximum Detect	0.13	Maximum Non-Detect	0.11
Variance Detected	2.0000E-4	Percent Non-Detects	84.62%
Mean Detected	0.12	SD Detected	0.0141
Mean of Detected Logged Data	-2.124	SD of Detected Logged Data	0.118

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.112	KM SD	0.00533
95% UTL95% Coverage	0.126	95% KM UPL (t)	0.121
90% KM Percentile (z)	0.118	95% KM Percentile (z)	0.12
99% KM Percentile (z)	0.124	95% KM USL	0.124

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.065	SD	0.0247
95% UTL95% Coverage	0.131	95% UPL (t)	0.111
90% Percentile (z)	0.0967	95% Percentile (z)	0.106
99% Percentile (z)	0.123	95% USL	0.123

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	143.7	k star (bias corrected MLE)	N/A
Theta hat (MLE)	8.3527E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	574.7	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		

MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.112	SD (KM)	0.00533
Variance (KM)	2.8402E-5	SE of Mean (KM)	0.00209
k hat (KM)	438	k star (KM)	337
nu hat (KM)	11389	nu star (KM)	8762
theta hat (KM)	2.5464E-4	theta star (KM)	3.3098E-4
80% gamma percentile (KM)	0.117	90% gamma percentile (KM)	0.119
95% gamma percentile (KM)	0.122	99% gamma percentile (KM)	0.126

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.126	0.126	95% Approx. Gamma UPL	0.121	0.121
95% KM Gamma Percentile	0.12	0.12	95% Gamma USL	0.124	0.124

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0672	Mean in Log Scale	-2.78
SD in Original Scale	0.0287	SD in Log Scale	0.412
95% UTL95% Coverage	0.187	95% BCA UTL95% Coverage	0.13
95% Bootstrap (%) UTL95% Coverage	0.13	95% UPL (t)	0.133
90% Percentile (z)	0.105	95% Percentile (z)	0.122
99% Percentile (z)	0.162	95% USL	0.162

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.194	95% KM UTL (Lognormal)95% Coverage	0.125
KM SD of Logged Data	0.0445	95% KM UPL (Lognormal)	0.121
95% KM Percentile Lognormal (z)	0.12	95% KM USL (Lognormal)	0.124

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.065	Mean in Log Scale	-2.781
SD in Original Scale	0.0247	SD in Log Scale	0.294
95% UTL95% Coverage	0.136	95% UPL (t)	0.107
90% Percentile (z)	0.0903	95% Percentile (z)	0.1
99% Percentile (z)	0.123	95% USL	0.123

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	0.13
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.13
95% USL	0.13	95% KM Chebyshev UPL	0.136

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers

and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data

represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-41-7|ug/l|all_locations|metals|sw6020a|beryllium|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	0.11
Maximum Detect	0.26	Maximum Non-Detect	0.11
Variance Detected	4.5000E-4	Percent Non-Detects	85.71%
Mean Detected	0.245	SD Detected	0.0212
Mean of Detected Logged Data	-1.408	SD of Detected Logged Data	0.0867

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.129	KM SD	0.0476
95% UTL95% Coverage	0.254	95% KM UPL (t)	0.217
90% KM Percentile (z)	0.19	95% KM Percentile (z)	0.208
99% KM Percentile (z)	0.24	95% KM USL	0.242

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.0821	SD	0.0692
95% UTL95% Coverage	0.263	95% UPL (t)	0.209
90% Percentile (z)	0.171	95% Percentile (z)	0.196
99% Percentile (z)	0.243	95% USL	0.246

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	266.4	k star (bias corrected MLE)	N/A
Theta hat (MLE)	9.1952E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1066	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.129	SD (KM)	0.0476

Variance (KM)	0.00226	SE of Mean (KM)	0.018
k hat (KM)	7.384	k star (KM)	5.849
nu hat (KM)	206.7	nu star (KM)	163.8
theta hat (KM)	0.0175	theta star (KM)	0.0221
80% gamma percentile (KM)	0.171	90% gamma percentile (KM)	0.201
95% gamma percentile (KM)	0.228	99% gamma percentile (KM)	0.285

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.255	0.256	95% Approx. Gamma UPL	0.21	0.209
95% KM Gamma Percentile	0.2	0.199	95% Gamma USL	0.241	0.24

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.155	Mean in Log Scale	-1.912
SD in Original Scale	0.049	SD in Log Scale	0.309
95% UTL95% Coverage	0.332	95% BCA UTL95% Coverage	0.26
95% Bootstrap (%) UTL95% Coverage	0.26	95% UPL (t)	0.26
90% Percentile (z)	0.22	95% Percentile (z)	0.246
99% Percentile (z)	0.303	95% USL	0.308

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.093	95% KM UTL (Lognormal)95% Coverage	0.257
KM SD of Logged Data	0.281	95% KM UPL (Lognormal)	0.206
95% KM Percentile Lognormal (z)	0.196	95% KM USL (Lognormal)	0.24

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.0821	Mean in Log Scale	-2.687
SD in Original Scale	0.0692	SD in Log Scale	0.542
95% UTL95% Coverage	0.281	95% UPL (t)	0.184
90% Percentile (z)	0.136	95% Percentile (z)	0.166
99% Percentile (z)	0.24	95% USL	0.246

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	0.26
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.26
95% USL	0.26	95% KM Chebyshev UPL	0.344

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ProUCL Output - UTL/UPL
(version 5.1.002)

CONC (|7440-41-7|ug/l|all_locations|metals|sw6020a|beryllium|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.11	Minimum Non-Detect	0.11
Maximum Detect	1.1	Maximum Non-Detect	0.11
Variance Detected	0.32	Percent Non-Detects	78.57%
Mean Detected	0.447	SD Detected	0.566
Mean of Detected Logged Data	-1.384	SD of Detected Logged Data	1.284

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.765	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.182	KM SD	0.255
95% UTL95% Coverage	0.848	95% KM UPL (t)	0.649
90% KM Percentile (z)	0.508	95% KM Percentile (z)	0.601
99% KM Percentile (z)	0.774	95% KM USL	0.786

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.139	SD	0.278
95% UTL95% Coverage	0.865	95% UPL (t)	0.648
90% Percentile (z)	0.495	95% Percentile (z)	0.596
99% Percentile (z)	0.785	95% USL	0.797

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.999	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.447	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.992	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

ProUCL Output - UTL/UPL
(version 5.1.002)

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.104
Maximum	1.1	Median	0.01
SD	0.29	CV	2.796
k hat (MLE)	0.4	k star (bias corrected MLE)	0.362
Theta hat (MLE)	0.259	Theta star (bias corrected MLE)	0.286
nu hat (MLE)	11.19	nu star (bias corrected)	10.12
MLE Mean (bias corrected)	0.104	MLE Sd (bias corrected)	0.172
95% Percentile of Chisquare (2kstar)	3.11	90% Percentile	0.298
95% Percentile	0.445	99% Percentile	0.822

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.765	0.771	95% Approx. Gamma UPL	0.397	0.367
95% Gamma USL	0.633	0.621			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.182	SD (KM)	0.255
Variance (KM)	0.0648	SE of Mean (KM)	0.0833
k hat (KM)	0.512	k star (KM)	0.45
nu hat (KM)	14.33	nu star (KM)	12.59
theta hat (KM)	0.356	theta star (KM)	0.405
80% gamma percentile (KM)	0.297	90% gamma percentile (KM)	0.503
95% gamma percentile (KM)	0.726	99% gamma percentile (KM)	1.281

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.71	0.688	95% Approx. Gamma UPL	0.477	0.454
95% KM Gamma Percentile	0.429	0.408	95% Gamma USL	0.631	0.607

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.804	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.0981	Mean in Log Scale	-6.3
SD in Original Scale	0.291	SD in Log Scale	3.506
95% UTL95% Coverage	17.53	95% BCA UTL95% Coverage	1.1
95% Bootstrap (%) UTL95% Coverage	1.1	95% UPL (t)	1.135
90% Percentile (z)	0.164	95% Percentile (z)	0.586
99% Percentile (z)	6.395	95% USL	7.496

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.031	95% KM UTL (Lognormal)95% Coverage	0.615
KM SD of Logged Data	0.591	95% KM UPL (Lognormal)	0.388

95% KM Percentile Lognormal (z)	0.347	95% KM USL (Lognormal)	0.533

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.139	Mean in Log Scale	-2.575
SD in Original Scale	0.278	SD in Log Scale	0.819
95% UTL95% Coverage	0.647	95% UPL (t)	0.341
90% Percentile (z)	0.217	95% Percentile (z)	0.293
99% Percentile (z)	0.511	95% USL	0.531

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	1.1
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	1.1
95% USL	1.1	95% KM Chebyshev UPL	1.331

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-43-9|ug/l|without_mw11|metals|sw6020a|cadmium|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.19
Maximum Detect	N/A	Maximum Non-Detect	0.19
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-43-9|ug/l|without_mw11|metals|sw6020a|cadmium|d|) was not processed!

CONC (|7440-43-9|ug/l|without_mw11|metals|sw6020a|cadmium|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Minimum Detect	N/A	Minimum Non-Detect	0.19
Maximum Detect	N/A	Maximum Non-Detect	0.19
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-43-9|ug/l|without_mw11|metals|sw6020a|cadmium|t|) was not processed!

CONC (|7440-43-9|ug/l|all_locations|metals|sw6020a|cadmium|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.19
Maximum Detect	N/A	Maximum Non-Detect	0.19
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-43-9|ug/l|all_locations|metals|sw6020a|cadmium|d|) was not processed!

CONC (|7440-43-9|ug/l|all_locations|metals|sw6020a|cadmium|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.19
Maximum Detect	N/A	Maximum Non-Detect	0.19
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-43-9|ug/l|all_locations|metals|sw6020a|cadmium|t|) was not processed!

ProUCL Output - UTL/UPL
(version 5.1.002)

CONC (|7440-70-2|ug/l|without_mw11|metals|sw6020a|calcium (ca)|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	3750	First Quartile	4490
Second Largest	17300	Median	8330
Maximum	20500	Third Quartile	14700
Mean	9860	SD	5750
Coefficient of Variation	0.583	Skewness	0.591
Mean of logged Data	9.03	SD of logged Data	0.61

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	25218	90% Percentile (z)	17228
95% UPL (t)	20494	95% Percentile (z)	19317
95% USL	23260	99% Percentile (z)	23236

Gamma GOF Test

A-D Test Statistic	0.432	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.158	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.166	k star (bias corrected MLE)	2.486
Theta hat (MLE)	3115	Theta star (bias corrected MLE)	3966
nu hat (MLE)	82.3	nu star (bias corrected)	64.64
MLE Mean (bias corrected)	9860	MLE Sd (bias corrected)	6253

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	22979	90% Percentile	18236
95% Hawkins Wixley (HW) Approx. Gamma UPL	23524	95% Percentile	21866
95% WH Approx. Gamma UTL with 95% Coverage	32379	99% Percentile	29817
95% HW Approx. Gamma UTL with 95% Coverage	34145		
95% WH USL	28222	95% HW USL	29382

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	42567	90% Percentile (z)	18243
95% UPL (t)	25794	95% Percentile (z)	22767
95% USL	34586	99% Percentile (z)	34498

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	20500
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	20500	95% BCA Bootstrap UTL with 95% Coverage	20500
95% UPL	20500	90% Percentile	17080
90% Chebyshev UPL	27761	95% Percentile	18580
95% Chebyshev UPL	35869	99% Percentile	20116
95% USL	20500		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-70-2|ug/l|without_mw11|metals|sw6020a|calcium (ca)|t|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	3470	First Quartile	5310
Second Largest	16900	Median	8280
Maximum	18900	Third Quartile	15500
Mean	9749	SD	5647
Coefficient of Variation	0.579	Skewness	0.434
Mean of logged Data	9.013	SD of logged Data	0.627

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	24833	90% Percentile (z)	16987
95% UPL (t)	20195	95% Percentile (z)	19038
95% USL	22911	99% Percentile (z)	22887

ProUCL Output - UTL/UPL
(version 5.1.002)

Gamma GOF Test

A-D Test Statistic	0.457	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.164	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.07	k star (bias corrected MLE)	2.413
Theta hat (MLE)	3176	Theta star (bias corrected MLE)	4041
nu hat (MLE)	79.81	nu star (bias corrected)	62.73
MLE Mean (bias corrected)	9749	MLE Sd (bias corrected)	6277

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	22965	90% Percentile	18156
95% Hawkins Wixley (HW) Approx. Gamma UPL	23580	95% Percentile	21819
95% WH Approx. Gamma UTL with 95% Coverage	32485	99% Percentile	29857
95% HW Approx. Gamma UTL with 95% Coverage	34408		
95% WH USL	28272	95% HW USL	29547

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.152	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	43814	90% Percentile (z)	18337
95% UPL (t)	26180	95% Percentile (z)	23027
95% USL	35393	99% Percentile (z)	35300

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	18900
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	18900	95% BCA Bootstrap UTL with 95% Coverage	18900
95% UPL	18900	90% Percentile	16860
90% Chebyshev UPL	27331	95% Percentile	17700
95% Chebyshev UPL	35295	99% Percentile	18660
95% USL	18900		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-70-2|ug/l|all_locations|metals|sw6020a|calcium (ca)|d|)

ProUCL Output - UTL/UPL
(version 5.1.002)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	3750	First Quartile	4840
Second Largest	17300	Median	8885
Maximum	20500	Third Quartile	14075
Mean	9830	SD	5525
Coefficient of Variation	0.562	Skewness	0.626
Mean of logged Data	9.039	SD of logged Data	0.587

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	24273	90% Percentile (z)	16911
95% UPL (t)	19958	95% Percentile (z)	18918
95% USL	22934	99% Percentile (z)	22684

Gamma GOF Test

A-D Test Statistic	0.365	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.147	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.396	k star (bias corrected MLE)	2.716
Theta hat (MLE)	2894	Theta star (bias corrected MLE)	3619
nu hat (MLE)	95.1	nu star (bias corrected)	76.05
MLE Mean (bias corrected)	9830	MLE Sd (bias corrected)	5964

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	22177	90% Percentile	17824
95% Hawkins Wixley (HW) Approx. Gamma UPL	22666	95% Percentile	21233
95% WH Approx. Gamma UTL with 95% Coverage	30493	99% Percentile	28664
95% HW Approx. Gamma UTL with 95% Coverage	32002		
95% WH USL	27723	95% HW USL	28844

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	39054	90% Percentile (z)	17869
95% UPL (t)	24697	95% Percentile (z)	22115
95% USL	33877	99% Percentile (z)	32988

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	20500
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	20500	95% BCA Bootstrap UTL with 95% Coverage	20500
95% UPL	20500	90% Percentile	16970
90% Chebyshev UPL	26988	95% Percentile	18420
95% Chebyshev UPL	34760	99% Percentile	20084
95% USL	20500		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-70-2|ug/l|all_locations|metals|sw6020a|calcium (ca)|t|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	3470	First Quartile	5366
Second Largest	16900	Median	8820
Maximum	18900	Third Quartile	14700
Mean	9831	SD	5435
Coefficient of Variation	0.553	Skewness	0.391
Mean of logged Data	9.034	SD of logged Data	0.607

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	24037	90% Percentile (z)	16796
95% UPL (t)	19793	95% Percentile (z)	18771
95% USL	22720	99% Percentile (z)	22474

Gamma GOF Test

A-D Test Statistic	0.38	**Anderson-Darling Gamma GOF Test**

5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.144	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.286	k star (bias corrected MLE)	2.629
Theta hat (MLE)	2992	Theta star (bias corrected MLE)	3739
nu hat (MLE)	92.01	nu star (bias corrected)	73.63
MLE Mean (bias corrected)	9831	MLE Sd (bias corrected)	6063

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	22435	90% Percentile	17956
95% Hawkins Wixley (HW) Approx. Gamma UPL	23021	95% Percentile	21442
95% WH Approx. Gamma UTL with 95% Coverage	30966	99% Percentile	29052
95% HW Approx. Gamma UTL with 95% Coverage	32686		
95% WH USL	28121	95% HW USL	29412

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	40958	90% Percentile (z)	18242
95% UPL (t)	25496	95% Percentile (z)	22743
95% USL	35355	99% Percentile (z)	34396

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	18900
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	18900	95% BCA Bootstrap UTL with 95% Coverage	18900
95% UPL	18900	90% Percentile	16840
90% Chebyshev UPL	26707	95% Percentile	17600
95% Chebyshev UPL	34352	99% Percentile	18640
95% USL	18900		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-47-3|ug/l|without_mw11|metals|sw6020a|chromium|d|)

General Statistics

ProUCL Output - UTL/UPL
(version 5.1.002)

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.65	Minimum Non-Detect	0.59
Maximum Detect	0.96	Maximum Non-Detect	0.59
Variance Detected	0.032	Percent Non-Detects	76.92%
Mean Detected	0.753	SD Detected	0.179
Mean of Detected Logged Data	-0.301	SD of Detected Logged Data	0.225

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.628	KM SD	0.0983
95% UTL95% Coverage	0.89	95% KM UPL (t)	0.81
90% KM Percentile (z)	0.754	95% KM Percentile (z)	0.789
99% KM Percentile (z)	0.856	95% KM USL	0.857

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.401	SD	0.214
95% UTL95% Coverage	0.972	95% UPL (t)	0.796
90% Percentile (z)	0.675	95% Percentile (z)	0.753
99% Percentile (z)	0.898	95% USL	0.899

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	28.66	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0263	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	171.9	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

ProUCL Output - UTL/UPL
(version 5.1.002)

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.266
Maximum	0.96	Median	0.146
SD	0.313	CV	1.18
k hat (MLE)	0.547	k star (bias corrected MLE)	0.472
Theta hat (MLE)	0.486	Theta star (bias corrected MLE)	0.563
nu hat (MLE)	14.21	nu star (bias corrected)	12.27
MLE Mean (bias corrected)	0.266	MLE Sd (bias corrected)	0.387
95% Percentile of Chisquare (2kstar)	3.7	90% Percentile	0.727
95% Percentile	1.042	99% Percentile	1.819

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.17	2.738	95% Approx. Gamma UPL	1.178	1.328
95% Gamma USL	1.71	2.06			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.628	SD (KM)	0.0983
Variance (KM)	0.00966	SE of Mean (KM)	0.0334
k hat (KM)	40.77	k star (KM)	31.41
nu hat (KM)	1060	nu star (KM)	816.7
theta hat (KM)	0.0154	theta star (KM)	0.02
80% gamma percentile (KM)	0.719	90% gamma percentile (KM)	0.775
95% gamma percentile (KM)	0.823	99% gamma percentile (KM)	0.917

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.884	0.883	95% Approx. Gamma UPL	0.797	0.796
95% KM Gamma Percentile	0.776	0.775	95% Gamma USL	0.847	0.846

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.392	Mean in Log Scale	-1.095
SD in Original Scale	0.238	SD in Log Scale	0.585
95% UTL95% Coverage	1.594	95% BCA UTL95% Coverage	0.96
95% Bootstrap (%) UTL95% Coverage	0.96	95% UPL (t)	0.986
90% Percentile (z)	0.707	95% Percentile (z)	0.875
99% Percentile (z)	1.303	95% USL	1.306

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.475	95% KM UTL (Lognormal)95% Coverage	0.88
KM SD of Logged Data	0.13	95% KM UPL (Lognormal)	0.791
95% KM Percentile Lognormal (z)	0.77	95% KM USL (Lognormal)	0.842

Background DL/2 Statistics Assuming Lognormal Distribution

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Mean in Original Scale	0.401	Mean in Log Scale	-1.008
SD in Original Scale	0.214	SD in Log Scale	0.414
95% UTL95% Coverage	1.102	95% UPL (t)	0.784
90% Percentile (z)	0.62	95% Percentile (z)	0.72
99% Percentile (z)	0.955	95% USL	0.957

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	0.96
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.96
95% USL	0.96	95% KM Chebyshev UPL	1.072

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-47-3|ug/l|without_mw11|metals|sw6020a|chromium|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	5		
Number of Detects	4	Number of Non-Detects	9
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.76	Minimum Non-Detect	0.59
Maximum Detect	3.7	Maximum Non-Detect	0.59
Variance Detected	1.801	Percent Non-Detects	69.23%
Mean Detected	1.715	SD Detected	1.342
Mean of Detected Logged Data	0.348	SD of Detected Logged Data	0.678

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.781	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.371	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.936	KM SD	0.828
95% UTL95% Coverage	3.147	95% KM UPL (t)	2.467
90% KM Percentile (z)	1.997	95% KM Percentile (z)	2.298
99% KM Percentile (z)	2.862	95% KM USL	2.865

DL/2 Substitution Background Statistics Assuming Normal Distribution

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean	0.732	SD	0.957
95% UTL95% Coverage	3.288	95% UPL (t)	2.502
90% Percentile (z)	1.958	95% Percentile (z)	2.306
99% Percentile (z)	2.958	95% USL	2.962

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.461	Anderson-Darling GOF Test
5% A-D Critical Value	0.66	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.343	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.766	k star (bias corrected MLE)	0.858
Theta hat (MLE)	0.62	Theta star (bias corrected MLE)	1.998
nu hat (MLE)	22.13	nu star (bias corrected)	6.865
MLE Mean (bias corrected)	1.715		
MLE Sd (bias corrected)	1.851	95% Percentile of Chisquare (2kstar)	5.429

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.535
Maximum	3.7	Median	0.01
SD	1.059	CV	1.981
k hat (MLE)	0.283	k star (bias corrected MLE)	0.269
Theta hat (MLE)	1.886	Theta star (bias corrected MLE)	1.985
nu hat (MLE)	7.371	nu star (bias corrected)	7.003
MLE Mean (bias corrected)	0.535	MLE Sd (bias corrected)	1.03
95% Percentile of Chisquare (2kstar)	2.549	90% Percentile	1.595
95% Percentile	2.53	99% Percentile	4.994

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	5.374	6.584	95% Approx. Gamma UPL	2.555	2.692
95% Gamma USL	4.037	4.655			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.936	SD (KM)	0.828
Variance (KM)	0.685	SE of Mean (KM)	0.265
k hat (KM)	1.279	k star (KM)	1.035
nu hat (KM)	33.25	nu star (KM)	26.91
theta hat (KM)	0.732	theta star (KM)	0.904
80% gamma percentile (KM)	1.502	90% gamma percentile (KM)	2.137
95% gamma percentile (KM)	2.77	99% gamma percentile (KM)	4.237

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

ProUCL Output - UTL/UPL
(version 5.1.002)

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.066	3.066	95% Approx. Gamma UPL	2.162	2.124
95% KM Gamma Percentile	1.968	1.928	95% Gamma USL	2.666	2.644

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.623	Mean in Log Scale	-1.551
SD in Original Scale	1.017	SD in Log Scale	1.609
95% UTL95% Coverage	15.59	95% BCA UTL95% Coverage	3.7
95% Bootstrap (%) UTL95% Coverage	3.7	95% UPL (t)	4.158
90% Percentile (z)	1.667	95% Percentile (z)	2.991
99% Percentile (z)	8.954	95% USL	9.015

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.258	95% KM UTL (Lognormal)95% Coverage	3.091
KM SD of Logged Data	0.519	95% KM UPL (Lognormal)	2.018
95% KM Percentile Lognormal (z)	1.814	95% KM USL (Lognormal)	2.59

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.732	Mean in Log Scale	-0.738
SD in Original Scale	0.957	SD in Log Scale	0.826
95% UTL95% Coverage	4.346	95% UPL (t)	2.204
90% Percentile (z)	1.378	95% Percentile (z)	1.861
99% Percentile (z)	3.269	95% USL	3.28

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	3.7
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3.7
95% USL	3.7	95% KM Chebyshev UPL	4.68

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-47-3|ug/l|all_locations|metals|sw6020a|chromium|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	4		

ProUCL Output - UTL/UPL
(version 5.1.002)

Number of Detects	4	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.65	Minimum Non-Detect	0.59
Maximum Detect	7.8	Maximum Non-Detect	0.59
Variance Detected	12.44	Percent Non-Detects	71.43%
Mean Detected	2.515	SD Detected	3.526
Mean of Detected Logged Data	0.288	SD of Detected Logged Data	1.192

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.661	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.42	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.14	KM SD	1.85
95% UTL95% Coverage	5.975	95% KM UPL (t)	4.53
90% KM Percentile (z)	3.51	95% KM Percentile (z)	4.182
99% KM Percentile (z)	5.443	95% KM USL	5.527

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.929	SD	1.988
95% UTL95% Coverage	6.126	95% UPL (t)	4.574
90% Percentile (z)	3.477	95% Percentile (z)	4.2
99% Percentile (z)	5.554	95% USL	5.645

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.763	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.668	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.415	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.403	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.919	k star (bias corrected MLE)	0.396
Theta hat (MLE)	2.736	Theta star (bias corrected MLE)	6.344
nu hat (MLE)	7.354	nu star (bias corrected)	3.172
MLE Mean (bias corrected)	2.515		
MLE Sd (bias corrected)	3.994	95% Percentile of Chisquare (2kstar)	3.305

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.726

Maximum	7.8	Median	0.01
SD	2.061	CV	2.84
k hat (MLE)	0.247	k star (bias corrected MLE)	0.241
Theta hat (MLE)	2.943	Theta star (bias corrected MLE)	3.006
nu hat (MLE)	6.905	nu star (bias corrected)	6.759
MLE Mean (bias corrected)	0.726	MLE Sd (bias corrected)	1.477
95% Percentile of Chisquare (2kstar)	2.361	90% Percentile	2.183
95% Percentile	3.549	99% Percentile	7.204

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	6.317	7.041	95% Approx. Gamma UPL	3.003	2.899
95% Gamma USL	5.112	5.457			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.14	SD (KM)	1.85
Variance (KM)	3.421	SE of Mean (KM)	0.571
k hat (KM)	0.38	k star (KM)	0.346
nu hat (KM)	10.64	nu star (KM)	9.691
theta hat (KM)	3.001	theta star (KM)	3.294
80% gamma percentile (KM)	1.802	90% gamma percentile (KM)	3.298
95% gamma percentile (KM)	4.976	99% gamma percentile (KM)	9.264

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	4.925	4.756	95% Approx. Gamma UPL	3.192	3.015
95% KM Gamma Percentile	2.847	2.679	95% Gamma USL	4.333	4.152

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.738	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.359	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.744	Mean in Log Scale	-3.07
SD in Original Scale	2.055	SD in Log Scale	2.743
95% UTL95% Coverage	60.35	95% BCA UTL95% Coverage	7.8
95% Bootstrap (%) UTL95% Coverage	7.8	95% UPL (t)	7.086
90% Percentile (z)	1.561	95% Percentile (z)	4.228
99% Percentile (z)	27.42	95% USL	31.04

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.295	95% KM UTL (Lognormal)95% Coverage	4.218
KM SD of Logged Data	0.663	95% KM UPL (Lognormal)	2.513
95% KM Percentile Lognormal (z)	2.218	95% KM USL (Lognormal)	3.592

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.929	Mean in Log Scale	-0.79
SD in Original Scale	1.988	SD in Log Scale	0.91

95% UTL95% Coverage	4.898	95% UPL (t)	2.407
90% Percentile (z)	1.457	95% Percentile (z)	2.028
99% Percentile (z)	3.77	95% USL	3.929

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	7.8
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	7.8
95% USL	7.8	95% KM Chebyshev UPL	9.485

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-47-3|ug/l|all_locations|metals|sw6020a|chromium|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	6		
Number of Detects	5	Number of Non-Detects	9
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.76	Minimum Non-Detect	0.59
Maximum Detect	27.5	Maximum Non-Detect	0.59
Variance Detected	134.3	Percent Non-Detects	64.29%
Mean Detected	6.872	SD Detected	11.59
Mean of Detected Logged Data	0.941	SD of Detected Logged Data	1.451

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.63	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.408	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.834	KM SD	6.888
95% UTL95% Coverage	20.84	95% KM UPL (t)	15.46
90% KM Percentile (z)	11.66	95% KM Percentile (z)	14.16
99% KM Percentile (z)	18.86	95% KM USL	19.17

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.644	SD	7.213
95% UTL95% Coverage	21.5	95% UPL (t)	15.87

90% Percentile (z)	11.89	95% Percentile (z)	14.51
99% Percentile (z)	19.42	95% USL	19.75

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.677	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.705	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.318	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.369	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.623	k star (bias corrected MLE)	0.383
Theta hat (MLE)	11.03	Theta star (bias corrected MLE)	17.96
nu hat (MLE)	6.23	nu star (bias corrected)	3.825
MLE Mean (bias corrected)	6.872		
MLE Sd (bias corrected)	11.11	95% Percentile of Chisquare (2kstar)	3.228

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.461
Maximum	27.5	Median	0.01
SD	7.278	CV	2.958
k hat (MLE)	0.208	k star (bias corrected MLE)	0.211
Theta hat (MLE)	11.85	Theta star (bias corrected MLE)	11.68
nu hat (MLE)	5.812	nu star (bias corrected)	5.9
MLE Mean (bias corrected)	2.461	MLE Sd (bias corrected)	5.361
95% Percentile of Chisquare (2kstar)	2.142	90% Percentile	7.441
95% Percentile	12.5	99% Percentile	26.33

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	21.86	25.16	95% Approx. Gamma UPL	10.14	9.911
95% Gamma USL	17.58	19.27			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.834	SD (KM)	6.888
Variance (KM)	47.44	SE of Mean (KM)	2.058
k hat (KM)	0.169	k star (KM)	0.181
nu hat (KM)	4.739	nu star (KM)	5.057
theta hat (KM)	16.74	theta star (KM)	15.69
80% gamma percentile (KM)	3.523	90% gamma percentile (KM)	8.547
95% gamma percentile (KM)	14.98	99% gamma percentile (KM)	32.99

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	16.95	16.46	95% Approx. Gamma UPL	9.593	8.83

95% KM Gamma Percentile	8.215	7.481	95% Gamma USL	14.37	13.71

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.852	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.28	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.482	Mean in Log Scale	-2.438
SD in Original Scale	7.271	SD in Log Scale	3.137
95% UTL95% Coverage	317.5	95% BCA UTL95% Coverage	27.5
95% Bootstrap (%) UTL95% Coverage	27.5	95% UPL (t)	27.42
90% Percentile (z)	4.861	95% Percentile (z)	15.19
99% Percentile (z)	128.8	95% USL	148.5

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.00307	95% KM UTL (Lognormal)95% Coverage	15.4
KM SD of Logged Data	1.047	95% KM UPL (Lognormal)	6.798
95% KM Percentile Lognormal (z)	5.582	95% KM USL (Lognormal)	11.95

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.644	Mean in Log Scale	-0.449
SD in Original Scale	7.213	SD in Log Scale	1.343
95% UTL95% Coverage	21.36	95% UPL (t)	7.485
90% Percentile (z)	3.569	95% Percentile (z)	5.814
99% Percentile (z)	14.52	95% USL	15.43

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	27.5
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	27.5
95% USL	27.5	95% KM Chebyshev UPL	33.91

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|16065-83-1|ug/l|without_mw11|metals|sw6020a/calculation|chromium(iii), insoluble salts|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Minimum Detect	N/A	Minimum Non-Detect	0.59
Maximum Detect	N/A	Maximum Non-Detect	0.59
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|16065-83-1|ug/l|without_mw11|metals|sw6020a/calculation|chromium(iii), insoluble salts|d|) was not processed!

CONC (|16065-83-1|ug/l|without_mw11|metals|sw6020a/calculation|chromium(iii), insoluble salts|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	0.59
Maximum Detect	3.7	Maximum Non-Detect	0.59
Variance Detected	2.253	Percent Non-Detects	76.92%
Mean Detected	1.967	SD Detected	1.501
Mean of Detected Logged Data	0.5	SD of Detected Logged Data	0.7

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.908	KM SD	0.826
95% UTL95% Coverage	3.115	95% KM UPL (t)	2.436
90% KM Percentile (z)	1.967	95% KM Percentile (z)	2.267
99% KM Percentile (z)	2.83	95% KM USL	2.834

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.681	SD	0.955
95% UTL95% Coverage	3.233	95% UPL (t)	2.448
90% Percentile (z)	1.905	95% Percentile (z)	2.252
99% Percentile (z)	2.904	95% USL	2.908

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.986	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.659	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	17.92	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.462
Maximum	3.7	Median	0.01
SD	1.054	CV	2.285
k hat (MLE)	0.265	k star (bias corrected MLE)	0.255
Theta hat (MLE)	1.741	Theta star (bias corrected MLE)	1.808
nu hat (MLE)	6.893	nu star (bias corrected)	6.635
MLE Mean (bias corrected)	0.462	MLE Sd (bias corrected)	0.914
95% Percentile of Chisquare (2kstar)	2.455	90% Percentile	1.383
95% Percentile	2.22	99% Percentile	4.442

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	4.456	5.128	95% Approx. Gamma UPL	2.077	2.06
95% Gamma USL	3.324	3.602			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.908	SD (KM)	0.826
Variance (KM)	0.683	SE of Mean (KM)	0.281
k hat (KM)	1.206	k star (KM)	0.979
nu hat (KM)	31.36	nu star (KM)	25.46
theta hat (KM)	0.753	theta star (KM)	0.927
80% gamma percentile (KM)	1.463	90% gamma percentile (KM)	2.101
95% gamma percentile (KM)	2.74	99% gamma percentile (KM)	4.225

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.975	2.963	95% Approx. Gamma UPL	2.096	2.054
95% KM Gamma Percentile	1.908	1.864	95% Gamma USL	2.586	2.555

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.547	Mean in Log Scale	-1.972
SD in Original Scale	1.021	SD in Log Scale	1.819
95% UTL95% Coverage	17.92	95% BCA UTL95% Coverage	3.7
95% Bootstrap (%) UTL95% Coverage	3.7	95% UPL (t)	4.023
90% Percentile (z)	1.432	95% Percentile (z)	2.772
99% Percentile (z)	9.576	95% USL	9.649

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.291	95% KM UTL (Lognormal)95% Coverage	2.941
KM SD of Logged Data	0.513	95% KM UPL (Lognormal)	1.93
95% KM Percentile Lognormal (z)	1.738	95% KM USL (Lognormal)	2.47

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.681	Mean in Log Scale	-0.824
SD in Original Scale	0.955	SD in Log Scale	0.807
95% UTL95% Coverage	3.786	95% UPL (t)	1.951
90% Percentile (z)	1.234	95% Percentile (z)	1.654
99% Percentile (z)	2.867	95% USL	2.876

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	3.7
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	3.7
95% USL	3.7	95% KM Chebyshev UPL	4.646

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|16065-83-1|ug/l|all_locations|metals|sw6020a/calculation|chromium(iii), insoluble salts|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	7.3	Minimum Non-Detect	0.59
Maximum Detect	7.3	Maximum Non-Detect	0.59
Variance Detected	N/A	Percent Non-Detects	92.86%
Mean Detected	7.3	SD Detected	N/A
Mean of Detected Logged Data	1.988	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

ProUCL Output - UTL/UPL
(version 5.1.002)

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|16065-83-1|ug/l|all_locations|metals|sw6020a/calculation|chromium(iii), insoluble salts|d|) was not processed!

CONC (|16065-83-1|ug/l|all_locations|metals|sw6020a/calculation|chromium(iii), insoluble salts|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	4		
Number of Detects	4	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	1.1	Minimum Non-Detect	0.59
Maximum Detect	27	Maximum Non-Detect	0.59
Variance Detected	158.2	Percent Non-Detects	71.43%
Mean Detected	8.225	SD Detected	12.58
Mean of Detected Logged Data	1.199	SD of Detected Logged Data	1.511

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.701	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.391	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.771	KM SD	6.767
95% UTL95% Coverage	20.46	95% KM UPL (t)	15.18
90% KM Percentile (z)	11.44	95% KM Percentile (z)	13.9
99% KM Percentile (z)	18.51	95% KM USL	18.82

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.561	SD	7.094
95% UTL95% Coverage	21.1	95% UPL (t)	15.56
90% Percentile (z)	11.65	95% Percentile (z)	14.23
99% Percentile (z)	19.06	95% USL	19.38

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.544	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.674	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.309	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.407	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.669	k star (bias corrected MLE)	0.334
Theta hat (MLE)	12.29	Theta star (bias corrected MLE)	24.62
nu hat (MLE)	5.355	nu star (bias corrected)	2.672

MLE Mean (bias corrected)	8.225		
MLE Sd (bias corrected)	14.23	95% Percentile of Chisquare (2kstar)	2.951

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.357
Maximum	27	Median	0.01
SD	7.165	CV	3.04
k hat (MLE)	0.194	k star (bias corrected MLE)	0.2
Theta hat (MLE)	12.13	Theta star (bias corrected MLE)	11.77
nu hat (MLE)	5.441	nu star (bias corrected)	5.608
MLE Mean (bias corrected)	2.357	MLE Sd (bias corrected)	5.267
95% Percentile of Chisquare (2kstar)	2.063	90% Percentile	7.129
95% Percentile	12.14	99% Percentile	25.93

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	20.56	22.88	95% Approx. Gamma UPL	9.371	8.816
95% Gamma USL	16.46	17.43			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.771	SD (KM)	6.767
Variance (KM)	45.79	SE of Mean (KM)	2.088
k hat (KM)	0.168	k star (KM)	0.179
nu hat (KM)	4.697	nu star (KM)	5.024
theta hat (KM)	16.52	theta star (KM)	15.45
80% gamma percentile (KM)	3.431	90% gamma percentile (KM)	8.357
95% gamma percentile (KM)	14.67	99% gamma percentile (KM)	32.38

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	16.61	16.11	95% Approx. Gamma UPL	9.386	8.627
95% KM Gamma Percentile	8.034	7.305	95% Gamma USL	14.07	13.41

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.374	Mean in Log Scale	-3.3
SD in Original Scale	7.159	SD in Log Scale	3.666
95% UTL95% Coverage	535.4	95% BCA UTL95% Coverage	27
95% Bootstrap (%) UTL95% Coverage	27	95% UPL (t)	30.58
90% Percentile (z)	4.049	95% Percentile (z)	15.34

ProUCL Output - UTL/UPL
(version 5.1.002)

99% Percentile (z)	186.5	95% USL	220.2

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.0344	95% KM UTL (Lognormal)95% Coverage	14.93
KM SD of Logged Data	1.047	95% KM UPL (Lognormal)	6.591
95% KM Percentile Lognormal (z)	5.411	95% KM USL (Lognormal)	11.59

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.561	Mean in Log Scale	-0.53
SD in Original Scale	7.094	SD in Log Scale	1.347
95% UTL95% Coverage	19.89	95% UPL (t)	6.95
90% Percentile (z)	3.307	95% Percentile (z)	5.394
99% Percentile (z)	13.5	95% USL	14.35

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	27
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	27
95% USL	27	95% KM Chebyshev UPL	33.3

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|18540-29-9|ug/l|without_mw11|metals|e218.6|chromium(vi)|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	7		
Number of Detects	6	Number of Non-Detects	7
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.059	Minimum Non-Detect	0.015
Maximum Detect	0.56	Maximum Non-Detect	0.015
Variance Detected	0.0471	Percent Non-Detects	53.85%
Mean Detected	0.235	SD Detected	0.217
Mean of Detected Logged Data	-1.839	SD of Detected Logged Data	0.982

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.117	KM SD	0.174
95% UTL95% Coverage	0.581	95% KM UPL (t)	0.438
90% KM Percentile (z)	0.339	95% KM Percentile (z)	0.402
99% KM Percentile (z)	0.521	95% KM USL	0.521

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.113	SD	0.183
95% UTL95% Coverage	0.602	95% UPL (t)	0.452
90% Percentile (z)	0.347	95% Percentile (z)	0.414
99% Percentile (z)	0.539	95% USL	0.54

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.482	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.709	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.265	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.338	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.419	k star (bias corrected MLE)	0.821
Theta hat (MLE)	0.166	Theta star (bias corrected MLE)	0.287
nu hat (MLE)	17.03	nu star (bias corrected)	9.847
MLE Mean (bias corrected)	0.235		
MLE Sd (bias corrected)	0.26	95% Percentile of Chisquare (2kstar)	5.275

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.114
Maximum	0.56	Median	0.01
SD	0.182	CV	1.601
k hat (MLE)	0.542	k star (bias corrected MLE)	0.468
Theta hat (MLE)	0.21	Theta star (bias corrected MLE)	0.243
nu hat (MLE)	14.1	nu star (bias corrected)	12.18
MLE Mean (bias corrected)	0.114	MLE Sd (bias corrected)	0.167
95% Percentile of Chisquare (2kstar)	3.683	90% Percentile	0.312
95% Percentile	0.448	99% Percentile	0.784

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.896	1.029	95% Approx. Gamma UPL	0.481	0.502
95% Gamma USL	0.704	0.776			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.117	SD (KM)	0.174
Variance (KM)	0.0302	SE of Mean (KM)	0.0528

ProUCL Output - UTL/UPL
(version 5.1.002)

k hat (KM)	0.451	k star (KM)	0.398
nu hat (KM)	11.73	nu star (KM)	10.35
theta hat (KM)	0.259	theta star (KM)	0.293
80% gamma percentile (KM)	0.188	90% gamma percentile (KM)	0.33
95% gamma percentile (KM)	0.485	99% gamma percentile (KM)	0.877

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.789	0.872	95% Approx. Gamma UPL	0.441	0.45
95% KM Gamma Percentile	0.374	0.375	95% Gamma USL	0.628	0.672

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.875	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.232	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.114	Mean in Log Scale	-3.504
SD in Original Scale	0.182	SD in Log Scale	1.876
95% UTL95% Coverage	4.507	95% BCA UTL95% Coverage	0.56
95% Bootstrap (%) UTL95% Coverage	0.56	95% UPL (t)	0.966
90% Percentile (z)	0.333	95% Percentile (z)	0.658
99% Percentile (z)	2.361	95% USL	2.38

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-3.11	95% KM UTL (Lognormal)95% Coverage	1.536
KM SD of Logged Data	1.325	95% KM UPL (Lognormal)	0.517
95% KM Percentile Lognormal (z)	0.394	95% KM USL (Lognormal)	0.978

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.113	Mean in Log Scale	-3.483
SD in Original Scale	0.183	SD in Log Scale	1.707
95% UTL95% Coverage	2.93	95% UPL (t)	0.721
90% Percentile (z)	0.274	95% Percentile (z)	0.509
99% Percentile (z)	1.627	95% USL	1.639

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	0.56
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.56
95% USL	0.56	95% KM Chebyshev UPL	0.902

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.

ProUCL Output - UTL/UPL
(version 5.1.002)

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|18540-29-9|ug/l|without_mw11|metals|e218.6|chromium(vi)|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	9		
Number of Detects	8	Number of Non-Detects	5
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.016	Minimum Non-Detect	0.015
Maximum Detect	0.555	Maximum Non-Detect	0.015
Variance Detected	0.0435	Percent Non-Detects	38.46%
Mean Detected	0.183	SD Detected	0.208
Mean of Detected Logged Data	-2.346	SD of Detected Logged Data	1.268

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.787	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.314	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.119	KM SD	0.174
95% UTL95% Coverage	0.582	95% KM UPL (t)	0.44
90% KM Percentile (z)	0.341	95% KM Percentile (z)	0.404
99% KM Percentile (z)	0.522	95% KM USL	0.523

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.116	SD	0.182
95% UTL95% Coverage	0.603	95% UPL (t)	0.453
90% Percentile (z)	0.35	95% Percentile (z)	0.416
99% Percentile (z)	0.54	95% USL	0.541

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.415	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.249	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.9	k star (bias corrected MLE)	0.646
Theta hat (MLE)	0.204	Theta star (bias corrected MLE)	0.284
nu hat (MLE)	14.4	nu star (bias corrected)	10.33
MLE Mean (bias corrected)	0.183		
MLE Sd (bias corrected)	0.228	95% Percentile of Chisquare (2kstar)	4.526

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.117
Maximum	0.555	Median	0.033
SD	0.182	CV	1.558
k hat (MLE)	0.582	k star (bias corrected MLE)	0.499
Theta hat (MLE)	0.201	Theta star (bias corrected MLE)	0.234
nu hat (MLE)	15.13	nu star (bias corrected)	12.97
MLE Mean (bias corrected)	0.117	MLE Sd (bias corrected)	0.165
95% Percentile of Chisquare (2kstar)	3.836	90% Percentile	0.316
95% Percentile	0.449	99% Percentile	0.775

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.888	1.011	95% Approx. Gamma UPL	0.483	0.502
95% Gamma USL	0.7	0.768			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.119	SD (KM)	0.174
Variance (KM)	0.0301	SE of Mean (KM)	0.0515
k hat (KM)	0.467	k star (KM)	0.411
nu hat (KM)	12.15	nu star (KM)	10.68
theta hat (KM)	0.254	theta star (KM)	0.289
80% gamma percentile (KM)	0.192	90% gamma percentile (KM)	0.334
95% gamma percentile (KM)	0.488	99% gamma percentile (KM)	0.877

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.791	0.871	95% Approx. Gamma UPL	0.444	0.453
95% KM Gamma Percentile	0.378	0.378	95% Gamma USL	0.631	0.673

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.18	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.114	Mean in Log Scale	-3.667
SD in Original Scale	0.183	SD in Log Scale	2.065
95% UTL95% Coverage	6.351	95% BCA UTL95% Coverage	0.555
95% Bootstrap (%) UTL95% Coverage	0.555	95% UPL (t)	1.165
90% Percentile (z)	0.36	95% Percentile (z)	0.763
99% Percentile (z)	3.117	95% USL	3.144

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-3.059	95% KM UTL (Lognormal)95% Coverage	1.496
KM SD of Logged Data	1.296	95% KM UPL (Lognormal)	0.516
95% KM Percentile Lognormal (z)	0.396	95% KM USL (Lognormal)	0.962

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.116	Mean in Log Scale	-3.325
SD in Original Scale	0.182	SD in Log Scale	1.613
95% UTL95% Coverage	2.672	95% UPL (t)	0.71
90% Percentile (z)	0.284	95% Percentile (z)	0.511
99% Percentile (z)	1.532	95% USL	1.543

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	0.555
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.555
95% USL	0.555	95% KM Chebyshev UPL	0.904

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|18540-29-9|ug/l|all_locations|metals|e218.6|chromium(vi)|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	8		
Number of Detects	7	Number of Non-Detects	7
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.059	Minimum Non-Detect	0.015
Maximum Detect	0.56	Maximum Non-Detect	0.015
Variance Detected	0.0478	Percent Non-Detects	50%
Mean Detected	0.27	SD Detected	0.219
Mean of Detected Logged Data	-1.681	SD of Detected Logged Data	0.989

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

ProUCL Output - UTL/UPL
(version 5.1.002)

KM Mean	0.143	KM SD	0.192
95% UTL95% Coverage	0.644	95% KM UPL (t)	0.494
90% KM Percentile (z)	0.388	95% KM Percentile (z)	0.458
99% KM Percentile (z)	0.589	95% KM USL	0.597

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.139	SD	0.202
95% UTL95% Coverage	0.666	95% UPL (t)	0.508
90% Percentile (z)	0.397	95% Percentile (z)	0.47
99% Percentile (z)	0.608	95% USL	0.617

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.567	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.256	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.317	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.486	k star (bias corrected MLE)	0.944
Theta hat (MLE)	0.182	Theta star (bias corrected MLE)	0.286
nu hat (MLE)	20.81	nu star (bias corrected)	13.22
MLE Mean (bias corrected)	0.27		
MLE Sd (bias corrected)	0.278	95% Percentile of Chisquare (2kstar)	5.774

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.14
Maximum	0.56	Median	0.0345
SD	0.201	CV	1.433
k hat (MLE)	0.534	k star (bias corrected MLE)	0.467
Theta hat (MLE)	0.262	Theta star (bias corrected MLE)	0.3
nu hat (MLE)	14.95	nu star (bias corrected)	13.08
MLE Mean (bias corrected)	0.14	MLE Sd (bias corrected)	0.205
95% Percentile of Chisquare (2kstar)	3.676	90% Percentile	0.384
95% Percentile	0.551	99% Percentile	0.965

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.082	1.267	95% Approx. Gamma UPL	0.595	0.633
95% Gamma USL	0.91	1.035			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.143	SD (KM)	0.192
Variance (KM)	0.0368	SE of Mean (KM)	0.0554
k hat (KM)	0.553	k star (KM)	0.482
nu hat (KM)	15.49	nu star (KM)	13.5

theta hat (KM)	0.258	theta star (KM)	0.296
80% gamma percentile (KM)	0.234	90% gamma percentile (KM)	0.389
95% gamma percentile (KM)	0.555	99% gamma percentile (KM)	0.965

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.958	1.082	95% Approx. Gamma UPL	0.546	0.568
95% KM Gamma Percentile	0.469	0.478	95% Gamma USL	0.814	0.896

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.851	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.242	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.142	Mean in Log Scale	-3.107
SD in Original Scale	0.199	SD in Log Scale	1.743
95% UTL95% Coverage	4.257	95% BCA UTL95% Coverage	0.56
95% Bootstrap (%) UTL95% Coverage	0.56	95% UPL (t)	1.092
90% Percentile (z)	0.417	95% Percentile (z)	0.786
99% Percentile (z)	2.578	95% USL	2.79

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.94	95% KM UTL (Lognormal)95% Coverage	2.14
KM SD of Logged Data	1.416	95% KM UPL (Lognormal)	0.708
95% KM Percentile Lognormal (z)	0.543	95% KM USL (Lognormal)	1.519

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.139	Mean in Log Scale	-3.287
SD in Original Scale	0.202	SD in Log Scale	1.797
95% UTL95% Coverage	4.095	95% UPL (t)	1.007
90% Percentile (z)	0.374	95% Percentile (z)	0.718
99% Percentile (z)	2.442	95% USL	2.65

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	0.56
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.56
95% USL	0.56	95% KM Chebyshev UPL	1.008

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ProUCL Output - UTL/UPL
(version 5.1.002)

CONC (|18540-29-9|ug/l|all_locations|metals|e218.6|chromium(vi)|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	10		
Number of Detects	9	Number of Non-Detects	5
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.016	Minimum Non-Detect	0.015
Maximum Detect	0.555	Maximum Non-Detect	0.015
Variance Detected	0.0415	Percent Non-Detects	35.71%
Mean Detected	0.203	SD Detected	0.204
Mean of Detected Logged Data	-2.198	SD of Detected Logged Data	1.265

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.844	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.282	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.136	KM SD	0.178
95% UTL95% Coverage	0.602	95% KM UPL (t)	0.463
90% KM Percentile (z)	0.365	95% KM Percentile (z)	0.429
99% KM Percentile (z)	0.551	95% KM USL	0.559

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.133	SD	0.187
95% UTL95% Coverage	0.622	95% UPL (t)	0.476
90% Percentile (z)	0.373	95% Percentile (z)	0.441
99% Percentile (z)	0.568	95% USL	0.577

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.39	Anderson-Darling GOF Test
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.287	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.96	k star (bias corrected MLE)	0.714
Theta hat (MLE)	0.212	Theta star (bias corrected MLE)	0.284
nu hat (MLE)	17.28	nu star (bias corrected)	12.85
MLE Mean (bias corrected)	0.203		
MLE Sd (bias corrected)	0.24	95% Percentile of Chisquare (2kstar)	4.826

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.134
Maximum	0.555	Median	0.0385
SD	0.186	CV	1.39
k hat (MLE)	0.59	k star (bias corrected MLE)	0.512
Theta hat (MLE)	0.227	Theta star (bias corrected MLE)	0.262
nu hat (MLE)	16.53	nu star (bias corrected)	14.32
MLE Mean (bias corrected)	0.134	MLE Sd (bias corrected)	0.188
95% Percentile of Chisquare (2kstar)	3.898	90% Percentile	0.361
95% Percentile	0.511	99% Percentile	0.879

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.986	1.143	95% Approx. Gamma UPL	0.553	0.585
95% Gamma USL	0.834	0.94			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.136	SD (KM)	0.178
Variance (KM)	0.0318	SE of Mean (KM)	0.0506
k hat (KM)	0.58	k star (KM)	0.503
nu hat (KM)	16.24	nu star (KM)	14.1
theta hat (KM)	0.234	theta star (KM)	0.27
80% gamma percentile (KM)	0.223	90% gamma percentile (KM)	0.367
95% gamma percentile (KM)	0.521	99% gamma percentile (KM)	0.898

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.884	0.992	95% Approx. Gamma UPL	0.51	0.529
95% KM Gamma Percentile	0.439	0.448	95% Gamma USL	0.753	0.825

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.132	Mean in Log Scale	-3.372
SD in Original Scale	0.188	SD in Log Scale	1.973
95% UTL95% Coverage	5.959	95% BCA UTL95% Coverage	0.555
95% Bootstrap (%) UTL95% Coverage	0.555	95% UPL (t)	1.277
90% Percentile (z)	0.43	95% Percentile (z)	0.881
99% Percentile (z)	3.378	95% USL	3.694

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.913	95% KM UTL (Lognormal)95% Coverage	1.873

KM SD of Logged Data	1.354	95% KM UPL (Lognormal)	0.65
95% KM Percentile Lognormal (z)	0.504	95% KM USL (Lognormal)	1.349

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.133	Mean in Log Scale	-3.161
SD in Original Scale	0.187	SD in Log Scale	1.667
95% UTL95% Coverage	3.313	95% UPL (t)	0.901
90% Percentile (z)	0.359	95% Percentile (z)	0.658
99% Percentile (z)	2.051	95% USL	2.212

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	0.555
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.555
95% USL	0.555	95% KM Chebyshev UPL	0.941

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-48-4|ug/l|without_mw11|metals|sw6020a|cobalt|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	0.505	First Quartile	0.99
Second Largest	5.3	Median	1.6
Maximum	6.2	Third Quartile	3.6
Mean	2.352	SD	1.88
Coefficient of Variation	0.799	Skewness	0.97
Mean of logged Data	0.546	SD of logged Data	0.834

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.21	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	7.374	90% Percentile (z)	4.762
95% UPL (t)	5.83	95% Percentile (z)	5.445
95% USL	6.734	99% Percentile (z)	6.726

ProUCL Output - UTL/UPL
(version 5.1.002)

Gamma GOF Test

A-D Test Statistic	0.412	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.167	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.24	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.765	k star (bias corrected MLE)	1.409
Theta hat (MLE)	1.333	Theta star (bias corrected MLE)	1.669
nu hat (MLE)	45.9	nu star (bias corrected)	36.64
MLE Mean (bias corrected)	2.352	MLE Sd (bias corrected)	1.982

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	6.712	90% Percentile	4.977
95% Hawkins Wixley (HW) Approx. Gamma UPL	6.948	95% Percentile	6.258
95% WH Approx. Gamma UTL with 95% Coverage	10.24	99% Percentile	9.161
95% HW Approx. Gamma UTL with 95% Coverage	11.1		
95% WH USL	8.66	95% HW USL	9.199

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	16.03	90% Percentile (z)	5.03
95% UPL (t)	8.079	95% Percentile (z)	6.811
95% USL	12.07	99% Percentile (z)	12.03

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	6.2
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	6.2	95% BCA Bootstrap UTL with 95% Coverage	6.2
95% UPL	6.2	90% Percentile	5
90% Chebyshev UPL	8.206	95% Percentile	5.66
95% Chebyshev UPL	10.86	99% Percentile	6.092
95% USL	6.2		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-48-4|ug/l|without_mw11|metals|sw6020a|cobalt|t|)

ProUCL Output - UTL/UPL
(version 5.1.002)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	0.21	First Quartile	0.49
Second Largest	5.7	Median	1.9
Maximum	6.2	Third Quartile	3.1
Mean	2.301	SD	2.014
Coefficient of Variation	0.875	Skewness	0.856
Mean of logged Data	0.341	SD of logged Data	1.159

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	7.679	90% Percentile (z)	4.881
95% UPL (t)	6.025	95% Percentile (z)	5.613
95% USL	6.994	99% Percentile (z)	6.985

Gamma GOF Test

A-D Test Statistic	0.299	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.146	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.242	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.153	k star (bias corrected MLE)	0.938
Theta hat (MLE)	1.995	Theta star (bias corrected MLE)	2.452
nu hat (MLE)	29.98	nu star (bias corrected)	24.39
MLE Mean (bias corrected)	2.301	MLE Sd (bias corrected)	2.375

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	7.745	90% Percentile	5.381
95% Hawkins Wixley (HW) Approx. Gamma UPL	8.33	95% Percentile	7.05
95% WH Approx. Gamma UTL with 95% Coverage	12.59	99% Percentile	10.94
95% HW Approx. Gamma UTL with 95% Coverage	14.5		
95% WH USL	10.39	95% HW USL	11.63

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.18	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	31.1	90% Percentile (z)	6.211
95% UPL (t)	12	95% Percentile (z)	9.465
95% USL	20.96	99% Percentile (z)	20.86

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	6.2
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	6.2	95% BCA Bootstrap UTL with 95% Coverage	6.2
95% UPL	6.2	90% Percentile	5.36
90% Chebyshev UPL	8.57	95% Percentile	5.9
95% Chebyshev UPL	11.41	99% Percentile	6.14
95% USL	6.2		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-48-4|ug/l|all_locations|metals|sw6020a|cobalt|d|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	0.505	First Quartile	0.994
Second Largest	6.2	Median	1.75
Maximum	11.2	Third Quartile	3.75
Mean	2.984	SD	2.976
Coefficient of Variation	0.997	Skewness	1.827
Mean of logged Data	0.68	SD of logged Data	0.945

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	10.76	90% Percentile (z)	6.798
95% UPL (t)	8.439	95% Percentile (z)	7.879
95% USL	10.04	99% Percentile (z)	9.907

Gamma GOF Test

A-D Test Statistic	0.391	**Anderson-Darling Gamma GOF Test**

ProUCL Output - UTL/UPL
(version 5.1.002)

5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.159	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.233	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.351	k star (bias corrected MLE)	1.109
Theta hat (MLE)	2.209	Theta star (bias corrected MLE)	2.69
nu hat (MLE)	37.83	nu star (bias corrected)	31.06
MLE Mean (bias corrected)	2.984	MLE Sd (bias corrected)	2.834

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	9.217	90% Percentile	6.698
95% Hawkins Wixley (HW) Approx. Gamma UPL	9.518	95% Percentile	8.62
95% WH Approx. Gamma UTL with 95% Coverage	14.35	99% Percentile	13.05
95% HW Approx. Gamma UTL with 95% Coverage	15.57		
95% WH USL	12.59	95% HW USL	13.45

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.129	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	23.31	90% Percentile (z)	6.621
95% UPL (t)	11.15	95% Percentile (z)	9.332
95% USL	18.54	99% Percentile (z)	17.76

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	11.2
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	11.2	95% BCA Bootstrap UTL with 95% Coverage	11.2
95% UPL	11.2	90% Percentile	5.93
90% Chebyshev UPL	12.22	95% Percentile	7.95
95% Chebyshev UPL	16.41	99% Percentile	10.55
95% USL	11.2		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-48-4|ug/l|all_locations|metals|sw6020a|cobalt|t|)

General Statistics

ProUCL Output - UTL/UPL
(version 5.1.002)

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	0.21	First Quartile	0.61
Second Largest	6.2	Median	1.95
Maximum	18.1	Third Quartile	3.775
Mean	3.429	SD	4.645
Coefficient of Variation	1.354	Skewness	2.727
Mean of logged Data	0.523	SD of logged Data	1.307

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.666	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	15.57	90% Percentile (z)	9.382
95% UPL (t)	11.94	95% Percentile (z)	11.07
95% USL	14.44	99% Percentile (z)	14.23

Gamma GOF Test

A-D Test Statistic	0.296	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.767	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.114	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.832	k star (bias corrected MLE)	0.702
Theta hat (MLE)	4.119	Theta star (bias corrected MLE)	4.887
nu hat (MLE)	23.31	nu star (bias corrected)	19.65
MLE Mean (bias corrected)	3.429	MLE Sd (bias corrected)	4.094

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	12.5	90% Percentile	8.603
95% Hawkins Wixley (HW) Approx. Gamma UPL	13.18	95% Percentile	11.66
95% WH Approx. Gamma UTL with 95% Coverage	20.95	99% Percentile	18.96
95% HW Approx. Gamma UTL with 95% Coverage	23.73		
95% WH USL	18.01	95% HW USL	19.95

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	51.34	90% Percentile (z)	9.003

95% UPL (t)	18.51	95% Percentile (z)	14.47
95% USL	37.41	99% Percentile (z)	35.26

Nonparametric Distribution Free Background Statistics

Data appear Gamma Distributed at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	18.1
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	18.1	95% BCA Bootstrap UTL with 95% Coverage	18.1
95% UPL	18.1	90% Percentile	6.05
90% Chebyshev UPL	17.85	95% Percentile	10.37
95% Chebyshev UPL	24.39	99% Percentile	16.55
95% USL	18.1		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-50-8|ug/l|without_mw11|metals|sw6020a|copper|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	10		
Number of Detects	9	Number of Non-Detects	4
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.54	Minimum Non-Detect	0.52
Maximum Detect	2.5	Maximum Non-Detect	0.52
Variance Detected	0.356	Percent Non-Detects	30.77%
Mean Detected	0.968	SD Detected	0.597
Mean of Detected Logged Data	-0.144	SD of Detected Logged Data	0.454

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.648	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.367	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.83	KM SD	0.512
95% UTL95% Coverage	2.197	95% KM UPL (t)	1.777
90% KM Percentile (z)	1.486	95% KM Percentile (z)	1.672
99% KM Percentile (z)	2.021	95% KM USL	2.023

DL/2 Substitution Background Statistics Assuming Normal Distribution

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean	0.75	SD	0.594
95% UTL95% Coverage	2.337	95% UPL (t)	1.849
90% Percentile (z)	1.512	95% Percentile (z)	1.727
99% Percentile (z)	2.132	95% USL	2.135

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.88	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.724	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.3	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.28	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.655	k star (bias corrected MLE)	3.177
Theta hat (MLE)	0.208	Theta star (bias corrected MLE)	0.305
nu hat (MLE)	83.79	nu star (bias corrected)	57.19
MLE Mean (bias corrected)	0.968		
MLE Sd (bias corrected)	0.543	95% Percentile of Chisquare (2kstar)	13.12

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.682
Maximum	2.5	Median	0.68
SD	0.662	CV	0.97
k hat (MLE)	0.649	k star (bias corrected MLE)	0.551
Theta hat (MLE)	1.05	Theta star (bias corrected MLE)	1.238
nu hat (MLE)	16.88	nu star (bias corrected)	14.32
MLE Mean (bias corrected)	0.682	MLE Sd (bias corrected)	0.919
95% Percentile of Chisquare (2kstar)	4.088	90% Percentile	1.807
95% Percentile	2.53	99% Percentile	4.292

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	5.018	6.652	95% Approx. Gamma UPL	2.849	3.372
95% Gamma USL	4.02	5.09			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.83	SD (KM)	0.512
Variance (KM)	0.262	SE of Mean (KM)	0.151
k hat (KM)	2.63	k star (KM)	2.074
nu hat (KM)	68.38	nu star (KM)	53.94
theta hat (KM)	0.316	theta star (KM)	0.4
80% gamma percentile (KM)	1.237	90% gamma percentile (KM)	1.6
95% gamma percentile (KM)	1.946	99% gamma percentile (KM)	2.711

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.228	2.243	95% Approx. Gamma UPL	1.667	1.656
95% KM Gamma Percentile	1.543	1.53	95% Gamma USL	1.982	1.984

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.828	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.762	Mean in Log Scale	-0.478
SD in Original Scale	0.585	SD in Log Scale	0.654
95% UTL95% Coverage	3.552	95% BCA UTL95% Coverage	2.5
95% Bootstrap (%) UTL95% Coverage	2.5	95% UPL (t)	2.076
90% Percentile (z)	1.432	95% Percentile (z)	1.816
99% Percentile (z)	2.835	95% USL	2.843

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.301	95% KM UTL (Lognormal)95% Coverage	2.316
KM SD of Logged Data	0.427	95% KM UPL (Lognormal)	1.631
95% KM Percentile Lognormal (z)	1.494	95% KM USL (Lognormal)	2.002

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.75	Mean in Log Scale	-0.514
SD in Original Scale	0.594	SD in Log Scale	0.687
95% UTL95% Coverage	3.744	95% UPL (t)	2.13
90% Percentile (z)	1.442	95% Percentile (z)	1.85
99% Percentile (z)	2.955	95% USL	2.963

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	2.5
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2.5
95% USL	2.5	95% KM Chebyshev UPL	3.145

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-50-8|ug/l|without_mw11|metals|sw6020a|copper|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	5		

ProUCL Output - UTL/UPL
(version 5.1.002)

Number of Detects	4	Number of Non-Detects	9
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.73	Minimum Non-Detect	0.52
Maximum Detect	2.4	Maximum Non-Detect	0.52
Variance Detected	0.622	Percent Non-Detects	69.23%
Mean Detected	1.245	SD Detected	0.789
Mean of Detected Logged Data	0.0921	SD of Detected Logged Data	0.555

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.323	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.743	KM SD	0.505
95% UTL95% Coverage	2.093	95% KM UPL (t)	1.678
90% KM Percentile (z)	1.391	95% KM Percentile (z)	1.574
99% KM Percentile (z)	1.919	95% KM USL	1.921

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.563	SD	0.616
95% UTL95% Coverage	2.208	95% UPL (t)	1.702
90% Percentile (z)	1.352	95% Percentile (z)	1.576
99% Percentile (z)	1.996	95% USL	1.998

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.507	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.281	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.095	k star (bias corrected MLE)	1.19
Theta hat (MLE)	0.304	Theta star (bias corrected MLE)	1.046
nu hat (MLE)	32.76	nu star (bias corrected)	9.523
MLE Mean (bias corrected)	1.245		
MLE Sd (bias corrected)	1.141	95% Percentile of Chisquare (2kstar)	6.71

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.39

ProUCL Output - UTL/UPL
(version 5.1.002)

Maximum	2.4	Median	0.01
SD	0.712	CV	1.826
k hat (MLE)	0.309	k star (bias corrected MLE)	0.289
Theta hat (MLE)	1.261	Theta star (bias corrected MLE)	1.348
nu hat (MLE)	8.042	nu star (bias corrected)	7.52
MLE Mean (bias corrected)	0.39	MLE Sd (bias corrected)	0.725
95% Percentile of Chisquare (2kstar)	2.677	90% Percentile	1.155
95% Percentile	1.805	99% Percentile	3.502

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	3.868	4.729	95% Approx. Gamma UPL	1.869	1.979
95% Gamma USL	2.922	3.372			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.743	SD (KM)	0.505
Variance (KM)	0.255	SE of Mean (KM)	0.162
k hat (KM)	2.162	k star (KM)	1.714
nu hat (KM)	56.2	nu star (KM)	44.56
theta hat (KM)	0.344	theta star (KM)	0.434
80% gamma percentile (KM)	1.133	90% gamma percentile (KM)	1.499
95% gamma percentile (KM)	1.852	99% gamma percentile (KM)	2.642

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.072	2.075	95% Approx. Gamma UPL	1.533	1.515
95% KM Gamma Percentile	1.415	1.395	95% Gamma USL	1.835	1.827

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.491	Mean in Log Scale	-1.451
SD in Original Scale	0.661	SD in Log Scale	1.308
95% UTL95% Coverage	7.709	95% BCA UTL95% Coverage	2.4
95% Bootstrap (%) UTL95% Coverage	2.4	95% UPL (t)	2.633
90% Percentile (z)	1.253	95% Percentile (z)	2.015
99% Percentile (z)	4.912	95% USL	4.939

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.424	95% KM UTL (Lognormal)95% Coverage	2.093
KM SD of Logged Data	0.435	95% KM UPL (Lognormal)	1.464
95% KM Percentile Lognormal (z)	1.339	95% KM USL (Lognormal)	1.805

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.563	Mean in Log Scale	-0.904
SD in Original Scale	0.616	SD in Log Scale	0.745

95% UTL95% Coverage	2.961	95% UPL (t)	1.606
90% Percentile (z)	1.052	95% Percentile (z)	1.379
99% Percentile (z)	2.29	95% USL	2.298

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	2.4
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	2.4
95% USL	2.4	95% KM Chebyshev UPL	3.029

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-50-8|ug/l|all_locations|metals|sw6020a|copper|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	11		
Number of Detects	10	Number of Non-Detects	4
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.54	Minimum Non-Detect	0.52
Maximum Detect	39.2	Maximum Non-Detect	0.52
Variance Detected	146.5	Percent Non-Detects	28.57%
Mean Detected	4.791	SD Detected	12.1
Mean of Detected Logged Data	0.237	SD of Detected Logged Data	1.279

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.398	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.475	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	3.571	KM SD	9.894
95% UTL95% Coverage	29.43	95% KM UPL (t)	21.71
90% KM Percentile (z)	16.25	95% KM Percentile (z)	19.85
99% KM Percentile (z)	26.59	95% KM USL	27.04

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	3.496	SD	10.29
95% UTL95% Coverage	30.4	95% UPL (t)	22.36

90% Percentile (z)	16.69	95% Percentile (z)	20.43
99% Percentile (z)	27.44	95% USL	27.91

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.346	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.781	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.438	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.282	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.481	k star (bias corrected MLE)	0.403
Theta hat (MLE)	9.967	Theta star (bias corrected MLE)	11.88
nu hat (MLE)	9.614	nu star (bias corrected)	8.063
MLE Mean (bias corrected)	4.791		
MLE Sd (bias corrected)	7.545	95% Percentile of Chisquare (2kstar)	3.341

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.425
Maximum	39.2	Median	0.745
SD	10.32	CV	3.012
k hat (MLE)	0.291	k star (bias corrected MLE)	0.277
Theta hat (MLE)	11.75	Theta star (bias corrected MLE)	12.38
nu hat (MLE)	8.16	nu star (bias corrected)	7.745
MLE Mean (bias corrected)	3.425	MLE Sd (bias corrected)	6.512
95% Percentile of Chisquare (2kstar)	2.596	90% Percentile	10.19
95% Percentile	16.08	99% Percentile	31.52

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	27.5	30.95	95% Approx. Gamma UPL	13.69	13.61
95% Gamma USL	22.52	24.41			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.571	SD (KM)	9.894
Variance (KM)	97.89	SE of Mean (KM)	2.787
k hat (KM)	0.13	k star (KM)	0.15
nu hat (KM)	3.647	nu star (KM)	4.199
theta hat (KM)	27.42	theta star (KM)	23.81
80% gamma percentile (KM)	3.886	90% gamma percentile (KM)	10.59
95% gamma percentile (KM)	19.65	99% gamma percentile (KM)	45.96

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	22.03	20.84	95% Approx. Gamma UPL	12.04	10.74

95% KM Gamma Percentile	10.2	8.997	95% Gamma USL	18.5	17.16

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.636	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.374	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	3.45	Mean in Log Scale	-0.533
SD in Original Scale	10.31	SD in Log Scale	1.679
95% UTL95% Coverage	47.31	95% BCA UTL95% Coverage	39.2
95% Bootstrap (%) UTL95% Coverage	39.2	95% UPL (t)	12.75
90% Percentile (z)	5.049	95% Percentile (z)	9.294
99% Percentile (z)	29.19	95% USL	31.5

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.0174	95% KM UTL (Lognormal)95% Coverage	17.52
KM SD of Logged Data	1.102	95% KM UPL (Lognormal)	7.41
95% KM Percentile Lognormal (z)	6.021	95% KM USL (Lognormal)	13.41

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	3.496	Mean in Log Scale	-0.215
SD in Original Scale	10.29	SD in Log Scale	1.298
95% UTL95% Coverage	23.99	95% UPL (t)	8.707
90% Percentile (z)	4.255	95% Percentile (z)	6.819
99% Percentile (z)	16.52	95% USL	17.52

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	39.2
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	39.2
95% USL	39.2	95% KM Chebyshev UPL	48.21

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-50-8|ug/l|all_locations|metals|sw6020a|copper|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	6		
Number of Detects	5	Number of Non-Detects	9
Number of Distinct Detects	5	Number of Distinct Non-Detects	1

ProUCL Output - UTL/UPL
(version 5.1.002)

Minimum Detect	0.73	Minimum Non-Detect	0.52
Maximum Detect	59.9	Maximum Non-Detect	0.52
Variance Detected	688.5	Percent Non-Detects	64.29%
Mean Detected	12.98	SD Detected	26.24
Mean of Detected Logged Data	0.892	SD of Detected Logged Data	1.853

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.573	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.457	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	4.969	KM SD	15.24
95% UTL95% Coverage	44.81	95% KM UPL (t)	32.91
90% KM Percentile (z)	24.5	95% KM Percentile (z)	30.04
99% KM Percentile (z)	40.43	95% KM USL	41.12

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	4.801	SD	15.87
95% UTL95% Coverage	46.28	95% UPL (t)	33.89
90% Percentile (z)	25.14	95% Percentile (z)	30.9
99% Percentile (z)	41.72	95% USL	42.44

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.928	Anderson-Darling GOF Test
5% A-D Critical Value	0.726	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.407	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.376	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.395	k star (bias corrected MLE)	0.291
Theta hat (MLE)	32.88	Theta star (bias corrected MLE)	44.56
nu hat (MLE)	3.947	nu star (bias corrected)	2.912
MLE Mean (bias corrected)	12.98		
MLE Sd (bias corrected)	24.05	95% Percentile of Chisquare (2kstar)	2.69

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.641
Maximum	59.9	Median	0.01
SD	15.92	CV	3.43

ProUCL Output - UTL/UPL
(version 5.1.002)

k hat (MLE)	0.179	k star (bias corrected MLE)	0.188
Theta hat (MLE)	25.9	Theta star (bias corrected MLE)	24.63
nu hat (MLE)	5.018	nu star (bias corrected)	5.276
MLE Mean (bias corrected)	4.641	MLE Sd (bias corrected)	10.69
95% Percentile of Chisquare (2kstar)	1.971	90% Percentile	14.02
95% Percentile	24.28	99% Percentile	52.8

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	37.05	38.86	95% Approx. Gamma UPL	16.62	14.73
95% Gamma USL	29.54	29.46			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.969	SD (KM)	15.24
Variance (KM)	232.3	SE of Mean (KM)	4.555
k hat (KM)	0.106	k star (KM)	0.131
nu hat (KM)	2.975	nu star (KM)	3.671
theta hat (KM)	46.76	theta star (KM)	37.9
80% gamma percentile (KM)	4.787	90% gamma percentile (KM)	14.39
95% gamma percentile (KM)	28	99% gamma percentile (KM)	68.68

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	31.91	29.62	95% Approx. Gamma UPL	16.61	14.35
95% KM Gamma Percentile	13.86	11.8	95% Gamma USL	26.44	23.99

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.751	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	4.647	Mean in Log Scale	-3.228
SD in Original Scale	15.92	SD in Log Scale	3.836
95% UTL95% Coverage	896.9	95% BCA UTL95% Coverage	59.9
95% Bootstrap (%) UTL95% Coverage	59.9	95% UPL (t)	44.86
90% Percentile (z)	5.409	95% Percentile (z)	21.79
99% Percentile (z)	297.6	95% USL	354

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.102	95% KM UTL (Lognormal)95% Coverage	22.9
KM SD of Logged Data	1.237	95% KM UPL (Lognormal)	8.716
95% KM Percentile Lognormal (z)	6.906	95% KM USL (Lognormal)	16.97

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	4.801	Mean in Log Scale	-0.547
SD in Original Scale	15.87	SD in Log Scale	1.515
95% UTL95% Coverage	30.37	95% UPL (t)	9.301
90% Percentile (z)	4.033	95% Percentile (z)	6.993

99% Percentile (z)	19.64	95% USL	21.03

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	59.9
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	59.9
95% USL	59.9	95% KM Chebyshev UPL	73.74

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-89-6|ug/l|without_mw11|metals|sw6020a|iron (fe)|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	7		
Number of Detects	7	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	41.8	Minimum Non-Detect	33.7
Maximum Detect	33100	Maximum Non-Detect	33.7
Variance Detected	1.552E+8	Percent Non-Detects	46.15%
Mean Detected	4847	SD Detected	12459
Mean of Detected Logged Data	5.422	SD of Detected Logged Data	2.338

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.461	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.498	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2625	KM SD	8798
95% UTL95% Coverage	26124	95% KM UPL (t)	18897
90% KM Percentile (z)	13900	95% KM Percentile (z)	17096
99% KM Percentile (z)	23092	95% KM USL	23129

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2618	SD	9159
95% UTL95% Coverage	27082	95% UPL (t)	19559
90% Percentile (z)	14356	95% Percentile (z)	17683
99% Percentile (z)	23926	95% USL	23964

ProUCL Output - UTL/UPL
(version 5.1.002)

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.42	Anderson-Darling GOF Test
5% A-D Critical Value	0.81	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.432	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.34	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.234	k star (bias corrected MLE)	0.229
Theta hat (MLE)	20688	Theta star (bias corrected MLE)	21155
nu hat (MLE)	3.28	nu star (bias corrected)	3.208
MLE Mean (bias corrected)	4847		
MLE Sd (bias corrected)	10126	95% Percentile of Chisquare (2kstar)	2.275

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2610
Maximum	33100	Median	41.8
SD	9162	CV	3.511
k hat (MLE)	0.113	k star (bias corrected MLE)	0.138
Theta hat (MLE)	23091	Theta star (bias corrected MLE)	18881
nu hat (MLE)	2.939	nu star (bias corrected)	3.594
MLE Mean (bias corrected)	2610	MLE Sd (bias corrected)	7020
95% Percentile of Chisquare (2kstar)	1.544	90% Percentile	7637
95% Percentile	14581	99% Percentile	35083

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	21229	22594	95% Approx. Gamma UPL	8798	7514
95% Gamma USL	15196	14842			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2625	SD (KM)	8798
Variance (KM)	77400945	SE of Mean (KM)	2636
k hat (KM)	0.089	k star (KM)	0.12
nu hat (KM)	2.315	nu star (KM)	3.114
theta hat (KM)	29482	theta star (KM)	21918
80% gamma percentile (KM)	2298	90% gamma percentile (KM)	7434
95% gamma percentile (KM)	14985	99% gamma percentile (KM)	38040

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	18437	16879	95% Approx. Gamma UPL	8232	6592
95% KM Gamma Percentile	6477	5015	95% Gamma USL	13545	11737

ProUCL Output - UTL/UPL
(version 5.1.002)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2610	Mean in Log Scale	2.525
SD in Original Scale	9162	SD in Log Scale	3.86
95% UTL95% Coverage	375264	95% BCA UTL95% Coverage	33100
95% Bootstrap (%) UTL95% Coverage	33100	95% UPL (t)	15749
90% Percentile (z)	1758	95% Percentile (z)	7146
99% Percentile (z)	99208	95% USL	100827

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	4.543	95% KM UTL (Lognormal)95% Coverage	13177
KM SD of Logged Data	1.851	95% KM UPL (Lognormal)	2881
95% KM Percentile Lognormal (z)	1973	95% KM USL (Lognormal)	7017

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2618	Mean in Log Scale	4.223
SD in Original Scale	9159	SD in Log Scale	2.133
95% UTL95% Coverage	20354	95% UPL (t)	3529
90% Percentile (z)	1051	95% Percentile (z)	2280
99% Percentile (z)	9758	95% USL	9846

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	33100
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	33100
95% USL	33100	95% KM Chebyshev UPL	42422

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-89-6|ug/l|without_mw11|metals|sw6020a|iron (fe)|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	11		
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	48	Minimum Non-Detect	33.7
Maximum Detect	30000	Maximum Non-Detect	33.7

ProUCL Output - UTL/UPL
(version 5.1.002)

Variance Detected	87362314	Percent Non-Detects	23.08%
Mean Detected	3460	SD Detected	9347
Mean of Detected Logged Data	6.077	SD of Detected Logged Data	1.859

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.416	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.455	Lilliefors GOF Test
5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2669	KM SD	7910
95% UTL95% Coverage	23796	95% KM UPL (t)	17299
90% KM Percentile (z)	12806	95% KM Percentile (z)	15680
99% KM Percentile (z)	21070	95% KM USL	21103

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2665	SD	8234
95% UTL95% Coverage	24659	95% UPL (t)	17895
90% Percentile (z)	13218	95% Percentile (z)	16209
99% Percentile (z)	21821	95% USL	21855

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.372	Anderson-Darling GOF Test
5% A-D Critical Value	0.808	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.32	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.287	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.328	k star (bias corrected MLE)	0.296
Theta hat (MLE)	10548	Theta star (bias corrected MLE)	11678
nu hat (MLE)	6.56	nu star (bias corrected)	5.925
MLE Mean (bias corrected)	3460		
MLE Sd (bias corrected)	6356	95% Percentile of Chisquare (2kstar)	2.721

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2661
Maximum	30000	Median	196
SD	8236	CV	3.095
k hat (MLE)	0.176	k star (bias corrected MLE)	0.186
Theta hat (MLE)	15153	Theta star (bias corrected MLE)	14279

ProUCL Output - UTL/UPL

(version 5.1.002)

nu hat (MLE)	4.566	nu star (bias corrected)	4.846
MLE Mean (bias corrected)	2661	MLE Sd (bias corrected)	6164
95% Percentile of Chisquare (2kstar)	1.955	90% Percentile	8038
95% Percentile	13960	99% Percentile	30458

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	23990	29361	95% Approx. Gamma UPL	10946	11247
95% Gamma USL	17759	20276			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2669	SD (KM)	7910
Variance (KM)	62565178	SE of Mean (KM)	2312
k hat (KM)	0.114	k star (KM)	0.139
nu hat (KM)	2.961	nu star (KM)	3.611
theta hat (KM)	23441	theta star (KM)	19220
80% gamma percentile (KM)	2717	90% gamma percentile (KM)	7818
95% gamma percentile (KM)	14900	99% gamma percentile (KM)	35791

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	20193	20657	95% Approx. Gamma UPL	9667	8794
95% KM Gamma Percentile	7791	6886	95% Gamma USL	15204	14820

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2663	Mean in Log Scale	5.047
SD in Original Scale	8235	SD in Log Scale	2.561
95% UTL95% Coverage	145345	95% BCA UTL95% Coverage	30000
95% Bootstrap (%) UTL95% Coverage	30000	95% UPL (t)	17733
90% Percentile (z)	4140	95% Percentile (z)	10498
99% Percentile (z)	60128	95% USL	60777

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	5.486	95% KM UTL (Lognormal)95% Coverage	37153
KM SD of Logged Data	1.886	95% KM UPL (Lognormal)	7894
95% KM Percentile Lognormal (z)	5366	95% KM USL (Lognormal)	19552

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2665	Mean in Log Scale	5.326
SD in Original Scale	8234	SD in Log Scale	2.151
95% UTL95% Coverage	64315	95% UPL (t)	10989
90% Percentile (z)	3239	95% Percentile (z)	7075
99% Percentile (z)	30645	95% USL	30923

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	30000
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	30000
95% USL	30000	95% KM Chebyshev UPL	38449

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-89-6|ug/l|all_locations|metals|sw6020a|iron (fe)|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	8		
Number of Detects	8	Number of Non-Detects	6
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	41.8	Minimum Non-Detect	33.7
Maximum Detect	33100	Maximum Non-Detect	33.7
Variance Detected	1.338E+8	Percent Non-Detects	42.86%
Mean Detected	4538	SD Detected	11568
Mean of Detected Logged Data	5.716	SD of Detected Logged Data	2.319

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.462	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.449	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2608	KM SD	8478
95% UTL95% Coverage	24769	95% KM UPL (t)	18149
90% KM Percentile (z)	13473	95% KM Percentile (z)	16553
99% KM Percentile (z)	22331	95% KM USL	22715

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2601	SD	8800
95% UTL95% Coverage	25605	95% UPL (t)	18732
90% Percentile (z)	13879	95% Percentile (z)	17076
99% Percentile (z)	23073	95% USL	23472

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

ProUCL Output - UTL/UPL
(version 5.1.002)

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.161	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.812	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.348	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.319	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.261	k star (bias corrected MLE)	0.246
Theta hat (MLE)	17396	Theta star (bias corrected MLE)	18420
nu hat (MLE)	4.174	nu star (bias corrected)	3.942
MLE Mean (bias corrected)	4538		
MLE Sd (bias corrected)	9143	95% Percentile of Chisquare (2kstar)	2.396

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2593
Maximum	33100	Median	43.3
SD	8803	CV	3.394
k hat (MLE)	0.121	k star (bias corrected MLE)	0.142
Theta hat (MLE)	21494	Theta star (bias corrected MLE)	18209
nu hat (MLE)	3.378	nu star (bias corrected)	3.988
MLE Mean (bias corrected)	2593	MLE Sd (bias corrected)	6872
95% Percentile of Chisquare (2kstar)	1.583	90% Percentile	7629
95% Percentile	14413	99% Percentile	34314

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	21368	24308	95% Approx. Gamma UPL	9355	8655
95% Gamma USL	16929	18136			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2608	SD (KM)	8478
Variance (KM)	71876299	SE of Mean (KM)	2422
k hat (KM)	0.0946	k star (KM)	0.122
nu hat (KM)	2.649	nu star (KM)	3.415
theta hat (KM)	27562	theta star (KM)	21382
80% gamma percentile (KM)	2329	90% gamma percentile (KM)	7421
95% gamma percentile (KM)	14850	99% gamma percentile (KM)	37434

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	18358	17704	95% Approx. Gamma UPL	8611	7309
95% KM Gamma Percentile	6944	5714	95% Gamma USL	14804	13730

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**

5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**		
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level		

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2594	Mean in Log Scale	2.988
SD in Original Scale	8802	SD in Log Scale	3.868
95% UTL95% Coverage	488474	95% BCA UTL95% Coverage	33100
95% Bootstrap (%) UTL95% Coverage	33100	95% UPL (t)	23823
90% Percentile (z)	2822	95% Percentile (z)	11502
99% Percentile (z)	160554	95% USL	191306

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	4.774	95% KM UTL (Lognormal)95% Coverage	20298
KM SD of Logged Data	1.968	95% KM UPL (Lognormal)	4365
95% KM Percentile Lognormal (z)	3014	95% KM USL (Lognormal)	12598

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2601	Mean in Log Scale	4.477
SD in Original Scale	8800	SD in Log Scale	2.259
95% UTL95% Coverage	32243	95% UPL (t)	5526
90% Percentile (z)	1590	95% Percentile (z)	3612
99% Percentile (z)	16837	95% USL	18651

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	33100
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	33100
95% USL	33100	95% KM Chebyshev UPL	40860

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-89-6|ug/l|all_locations|metals|sw6020a|iron (fe)|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	12		
Number of Detects	11	Number of Non-Detects	3
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	48	Minimum Non-Detect	33.7
Maximum Detect	30000	Maximum Non-Detect	33.7
Variance Detected	1.017E+8	Percent Non-Detects	21.43%
Mean Detected	4909	SD Detected	10086

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean of Detected Logged Data	6.422	SD of Detected Logged Data	2.102

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.555	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.425	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	3864	KM SD	8756
95% UTL95% Coverage	26752	95% KM UPL (t)	19914
90% KM Percentile (z)	15085	95% KM Percentile (z)	18266
99% KM Percentile (z)	24233	95% KM USL	24630

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	3861	SD	9088
95% UTL95% Coverage	27616	95% UPL (t)	20519
90% Percentile (z)	15507	95% Percentile (z)	18809
99% Percentile (z)	25002	95% USL	25414

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.181	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.815	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.297	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.275	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.327	k star (bias corrected MLE)	0.299
Theta hat (MLE)	14996	Theta star (bias corrected MLE)	16435
nu hat (MLE)	7.202	nu star (bias corrected)	6.571
MLE Mean (bias corrected)	4909		
MLE Sd (bias corrected)	8982	95% Percentile of Chisquare (2kstar)	2.736

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3857
Maximum	30000	Median	209.5
SD	9090	CV	2.357
k hat (MLE)	0.178	k star (bias corrected MLE)	0.188
Theta hat (MLE)	21620	Theta star (bias corrected MLE)	20539
nu hat (MLE)	4.995	nu star (bias corrected)	5.258
MLE Mean (bias corrected)	3857	MLE Sd (bias corrected)	8900

ProUCL Output - UTL/UPL
(version 5.1.002)

95% Percentile of Chisquare (2kstar)	1.966		90% Percentile	11652	
95% Percentile	20194		99% Percentile	43961	

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	36414	46589	95% Approx. Gamma UPL	17233	18530
95% Gamma USL	29432	35777			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3864	SD (KM)	8756
Variance (KM)	76662593	SE of Mean (KM)	2454
k hat (KM)	0.195	k star (KM)	0.201
nu hat (KM)	5.454	nu star (KM)	5.618
theta hat (KM)	19839	theta star (KM)	19258
80% gamma percentile (KM)	5101	90% gamma percentile (KM)	11687
95% gamma percentile (KM)	19894	99% gamma percentile (KM)	42474

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	31260	34487	95% Approx. Gamma UPL	15382	14936
95% KM Gamma Percentile	12603	11856	95% Gamma USL	25525	27088

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	3858	Mean in Log Scale	5.339
SD in Original Scale	9089	SD in Log Scale	2.859
95% UTL95% Coverage	367294	95% BCA UTL95% Coverage	30000
95% Bootstrap (%) UTL95% Coverage	30000	95% UPL (t)	39376
90% Percentile (z)	8134	95% Percentile (z)	22986
99% Percentile (z)	161358	95% USL	183676

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	5.8	95% KM UTL (Lognormal)95% Coverage	88663
KM SD of Logged Data	2.14	95% KM UPL (Lognormal)	16676
95% KM Percentile Lognormal (z)	11148	95% KM USL (Lognormal)	52790

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	3861	Mean in Log Scale	5.651
SD in Original Scale	9088	SD in Log Scale	2.397
95% UTL95% Coverage	149911	95% UPL (t)	23056
90% Percentile (z)	6145	95% Percentile (z)	14683
99% Percentile (z)	75222	95% USL	83852

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

ProUCL Output - UTL/UPL
(version 5.1.002)

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	30000
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	30000
95% USL	30000	95% KM Chebyshev UPL	43369

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-92-1|ug/l|without_mw11|metals|sw6020a|lead|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	12
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	0.12	Minimum Non-Detect	0.09
Maximum Detect	0.12	Maximum Non-Detect	0.09
Variance Detected	N/A	Percent Non-Detects	92.31%
Mean Detected	0.12	SD Detected	N/A
Mean of Detected Logged Data	-2.12	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7439-92-1|ug/l|without_mw11|metals|sw6020a|lead|d|) was not processed!

CONC (|7439-92-1|ug/l|without_mw11|metals|sw6020a|lead|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	6		
Number of Detects	5	Number of Non-Detects	8
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.09
Maximum Detect	1.5	Maximum Non-Detect	0.09
Variance Detected	0.331	Percent Non-Detects	61.54%
Mean Detected	0.644	SD Detected	0.576
Mean of Detected Logged Data	-0.898	SD of Detected Logged Data	1.177

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.303	KM SD	0.418
95% UTL95% Coverage	1.419	95% KM UPL (t)	1.076
90% KM Percentile (z)	0.839	95% KM Percentile (z)	0.99
99% KM Percentile (z)	1.275	95% KM USL	1.277

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.275	SD	0.45
95% UTL95% Coverage	1.477	95% UPL (t)	1.108
90% Percentile (z)	0.852	95% Percentile (z)	1.015
99% Percentile (z)	1.322	95% USL	1.324

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.328	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.689	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.248	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.363	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.233	k star (bias corrected MLE)	0.626
Theta hat (MLE)	0.522	Theta star (bias corrected MLE)	1.028
nu hat (MLE)	12.33	nu star (bias corrected)	6.265
MLE Mean (bias corrected)	0.644		
MLE Sd (bias corrected)	0.814	95% Percentile of Chisquare (2kstar)	4.439

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.254
Maximum	1.5	Median	0.01
SD	0.462	CV	1.82
k hat (MLE)	0.369	k star (bias corrected MLE)	0.335
Theta hat (MLE)	0.688	Theta star (bias corrected MLE)	0.758
nu hat (MLE)	9.588	nu star (bias corrected)	8.708
MLE Mean (bias corrected)	0.254	MLE Sd (bias corrected)	0.439
95% Percentile of Chisquare (2kstar)	2.956	90% Percentile	0.738
95% Percentile	1.12	99% Percentile	2.101

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	2.337	2.77	95% Approx. Gamma UPL	1.167	1.22
95% Gamma USL	1.786	2.012			

ProUCL Output - UTL/UPL
(version 5.1.002)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.303	SD (KM)	0.418
Variance (KM)	0.175	SE of Mean (KM)	0.13
k hat (KM)	0.526	k star (KM)	0.456
nu hat (KM)	13.68	nu star (KM)	11.86
theta hat (KM)	0.576	theta star (KM)	0.665
80% gamma percentile (KM)	0.495	90% gamma percentile (KM)	0.835
95% gamma percentile (KM)	1.203	99% gamma percentile (KM)	2.115

The following statistics are computed using gamma distribution and KM estimates
Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	1.695	1.778	95% Approx. Gamma UPL	1.01	1.004
95% KM Gamma Percentile	0.875	0.859	95% Gamma USL	1.382	1.417

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.257	Mean in Log Scale	-3.376
SD in Original Scale	0.461	SD in Log Scale	2.421
95% UTL95% Coverage	21.99	95% BCA UTL95% Coverage	1.5
95% Bootstrap (%) UTL95% Coverage	1.5	95% UPL (t)	3.01
90% Percentile (z)	0.761	95% Percentile (z)	1.833
99% Percentile (z)	9.546	95% USL	9.644

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-1.827	95% KM UTL (Lognormal)95% Coverage	2.223
KM SD of Logged Data	0.983	95% KM UPL (Lognormal)	0.991
95% KM Percentile Lognormal (z)	0.811	95% KM USL (Lognormal)	1.59

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.275	Mean in Log Scale	-2.254
SD in Original Scale	0.45	SD in Log Scale	1.307
95% UTL95% Coverage	3.442	95% UPL (t)	1.177
90% Percentile (z)	0.56	95% Percentile (z)	0.901
99% Percentile (z)	2.194	95% USL	2.206

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	1.5
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	1.5
95% USL	1.5	95% KM Chebyshev UPL	2.193

ProUCL Output - UTL/UPL
(version 5.1.002)

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-92-1|ug/l|all_locations|metals|sw6020a|lead|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	3		
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.12	Minimum Non-Detect	0.09
Maximum Detect	1.4	Maximum Non-Detect	0.09
Variance Detected	0.819	Percent Non-Detects	85.71%
Mean Detected	0.76	SD Detected	0.905
Mean of Detected Logged Data	-0.892	SD of Detected Logged Data	1.737

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.186	KM SD	0.337
95% UTL95% Coverage	1.066	95% KM UPL (t)	0.803
90% KM Percentile (z)	0.617	95% KM Percentile (z)	0.74
99% KM Percentile (z)	0.969	95% KM USL	0.985

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.147	SD	0.361
95% UTL95% Coverage	1.091	95% UPL (t)	0.809
90% Percentile (z)	0.61	95% Percentile (z)	0.741
99% Percentile (z)	0.987	95% USL	1.004

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.942	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.807	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.766	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

ProUCL Output - UTL/UPL
(version 5.1.002)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.186	SD (KM)	0.337
Variance (KM)	0.113	SE of Mean (KM)	0.127
k hat (KM)	0.304	k star (KM)	0.286
nu hat (KM)	8.51	nu star (KM)	8.02
theta hat (KM)	0.611	theta star (KM)	0.648
80% gamma percentile (KM)	0.281	90% gamma percentile (KM)	0.551
95% gamma percentile (KM)	0.862	99% gamma percentile (KM)	1.677

The following statistics are computed using gamma distribution and KM estimates
Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.856	0.82	95% Approx. Gamma UPL	0.541	0.506
95% KM Gamma Percentile	0.479	0.446	95% Gamma USL	0.748	0.71

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.109	Mean in Log Scale	-10.98
SD in Original Scale	0.373	SD in Log Scale	6.191
95% UTL95% Coverage	182.2	95% BCA UTL95% Coverage	1.4
95% Bootstrap (%) UTL95% Coverage	1.4	95% UPL (t)	1.448
90% Percentile (z)	0.0476	95% Percentile (z)	0.452
99% Percentile (z)	30.7	95% USL	40.64

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-2.191	95% KM UTL (Lognormal)95% Coverage	0.706
KM SD of Logged Data	0.705	95% KM UPL (Lognormal)	0.407
95% KM Percentile Lognormal (z)	0.356	95% KM USL (Lognormal)	0.595

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.147	Mean in Log Scale	-2.785
SD in Original Scale	0.361	SD in Log Scale	0.936
95% UTL95% Coverage	0.712	95% UPL (t)	0.343
90% Percentile (z)	0.205	95% Percentile (z)	0.288
99% Percentile (z)	0.544	95% USL	0.568

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	1.4
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	1.4
95% USL	1.4	95% KM Chebyshev UPL	1.706

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data

ProUCL Output - UTL/UPL
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represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-92-1|ug/l|all_locations|metals|sw6020a|lead|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	7		
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.09
Maximum Detect	10.5	Maximum Non-Detect	0.09
Variance Detected	16.46	Percent Non-Detects	57.14%
Mean Detected	2.287	SD Detected	4.056
Mean of Detected Logged Data	-0.356	SD of Detected Logged Data	1.694

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.611	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.41	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.031	KM SD	2.657
95% UTL95% Coverage	7.976	95% KM UPL (t)	5.902
90% KM Percentile (z)	4.436	95% KM Percentile (z)	5.401
99% KM Percentile (z)	7.212	95% KM USL	7.332

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	1.006	SD	2.767
95% UTL95% Coverage	8.238	95% UPL (t)	6.077
90% Percentile (z)	4.551	95% Percentile (z)	5.556
99% Percentile (z)	7.442	95% USL	7.567

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.469	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.348	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.532	k star (bias corrected MLE)	0.377
Theta hat (MLE)	4.3	Theta star (bias corrected MLE)	6.065
nu hat (MLE)	6.381	nu star (bias corrected)	4.524
MLE Mean (bias corrected)	2.287		
MLE Sd (bias corrected)	3.724	95% Percentile of Chisquare (2kstar)	3.197

ProUCL Output - UTL/UPL
(version 5.1.002)

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.986
Maximum	10.5	Median	0.01
SD	2.774	CV	2.814
k hat (MLE)	0.256	k star (bias corrected MLE)	0.248
Theta hat (MLE)	3.857	Theta star (bias corrected MLE)	3.968
nu hat (MLE)	7.155	nu star (bias corrected)	6.955
MLE Mean (bias corrected)	0.986	MLE Sd (bias corrected)	1.978
95% Percentile of Chisquare (2kstar)	2.409	90% Percentile	2.96
95% Percentile	4.78	99% Percentile	9.631

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	8.561	9.676	95% Approx. Gamma UPL	4.111	4.036
95% Gamma USL	6.946	7.524			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.031	SD (KM)	2.657
Variance (KM)	7.059	SE of Mean (KM)	0.778
k hat (KM)	0.151	k star (KM)	0.166
nu hat (KM)	4.22	nu star (KM)	4.649
theta hat (KM)	6.843	theta star (KM)	6.212
80% gamma percentile (KM)	1.213	90% gamma percentile (KM)	3.094
95% gamma percentile (KM)	5.558	99% gamma percentile (KM)	12.57

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	7.112	7.24	95% Approx. Gamma UPL	3.765	3.527
95% KM Gamma Percentile	3.158	2.903	95% Gamma USL	5.921	5.871

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.985	Mean in Log Scale	-3.553
SD in Original Scale	2.775	SD in Log Scale	3.38
95% UTL95% Coverage	196.9	95% BCA UTL95% Coverage	10.5
95% Bootstrap (%) UTL95% Coverage	10.5	95% UPL (t)	14.05
90% Percentile (z)	2.178	95% Percentile (z)	7.439
99% Percentile (z)	74.46	95% USL	86.79

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-1.529	95% KM UTL (Lognormal)95% Coverage	9.198
KM SD of Logged Data	1.434	95% KM UPL (Lognormal)	3.002
95% KM Percentile Lognormal (z)	2.292	95% KM USL (Lognormal)	6.498

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	1.006	Mean in Log Scale	-1.925
SD in Original Scale	2.767	SD in Log Scale	1.758
95% UTL95% Coverage	14.45	95% UPL (t)	3.661
90% Percentile (z)	1.389	95% Percentile (z)	2.63
99% Percentile (z)	8.714	95% USL	9.437

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	10.5
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	10.5
95% USL	10.5	95% KM Chebyshev UPL	13.02

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-95-4|ug/l|without_mw11|metals|sw6020a|magnesium (mg)|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	1870	First Quartile	3800
Second Largest	9580	Median	5680
Maximum	12700	Third Quartile	7300
Mean	5766	SD	3184
Coefficient of Variation	0.552	Skewness	0.771
Mean of logged Data	8.509	SD of logged Data	0.589

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.941	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.151	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	14270	90% Percentile (z)	9846
95% UPL (t)	11655	95% Percentile (z)	11003
95% USL	13186	99% Percentile (z)	13173

ProUCL Output - UTL/UPL
(version 5.1.002)

Gamma GOF Test

A-D Test Statistic	0.202	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.119	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.483	k star (bias corrected MLE)	2.731
Theta hat (MLE)	1655	Theta star (bias corrected MLE)	2112
nu hat (MLE)	90.56	nu star (bias corrected)	71
MLE Mean (bias corrected)	5766	MLE Sd (bias corrected)	3489

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	13023	90% Percentile	10443
95% Hawkins Wixley (HW) Approx. Gamma UPL	13347	95% Percentile	12436
95% WH Approx. Gamma UTL with 95% Coverage	18125	99% Percentile	16778
95% HW Approx. Gamma UTL with 95% Coverage	19111		
95% WH USL	15874	95% HW USL	16533

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	23908	90% Percentile (z)	10550
95% UPL (t)	14740	95% Percentile (z)	13067
95% USL	19565	99% Percentile (z)	19517

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	12700
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	12700	95% BCA Bootstrap UTL with 95% Coverage	12700
95% UPL	12700	90% Percentile	9342
90% Chebyshev UPL	15678	95% Percentile	10828
95% Chebyshev UPL	20168	99% Percentile	12326
95% USL	12700		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

ProUCL Output - UTL/UPL
(version 5.1.002)

CONC (|7439-95-4|ug/l|without_mw11|metals|sw6020a|magnesium (mg)|t|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	1750	First Quartile	3600
Second Largest	9520	Median	5400
Maximum	11600	Third Quartile	7370
Mean	5503	SD	2978
Coefficient of Variation	0.541	Skewness	0.639
Mean of logged Data	8.464	SD of logged Data	0.592

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	13458	90% Percentile (z)	9320
95% UPL (t)	11012	95% Percentile (z)	10402
95% USL	12444	99% Percentile (z)	12432

Gamma GOF Test

A-D Test Statistic	0.17	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.113	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.503	k star (bias corrected MLE)	2.746
Theta hat (MLE)	1571	Theta star (bias corrected MLE)	2004
nu hat (MLE)	91.07	nu star (bias corrected)	71.39
MLE Mean (bias corrected)	5503	MLE Sd (bias corrected)	3321

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	12411	90% Percentile	9955
95% Hawkins Wixley (HW) Approx. Gamma UPL	12741	95% Percentile	11850
95% WH Approx. Gamma UTL with 95% Coverage	17260	99% Percentile	15977
95% HW Approx. Gamma UTL with 95% Coverage	18238		
95% WH USL	15121	95% HW USL	15780

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	23051	90% Percentile (z)	10123
95% UPL (t)	14171	95% Percentile (z)	12553
95% USL	18842	99% Percentile (z)	18795

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	11600
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	11600	95% BCA Bootstrap UTL with 95% Coverage	11600
95% UPL	11600	90% Percentile	9190
90% Chebyshev UPL	14776	95% Percentile	10352
95% Chebyshev UPL	18976	99% Percentile	11350
95% USL	11600		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-95-4|ug/l|all_locations|metals|sw6020a|magnesium (mg)|d|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	1870	First Quartile	3813
Second Largest	9580	Median	4935
Maximum	12700	Third Quartile	7118
Mean	5646	SD	3091
Coefficient of Variation	0.548	Skewness	0.888
Mean of logged Data	8.496	SD of logged Data	0.568

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	13728	90% Percentile (z)	9608
95% UPL (t)	11313	95% Percentile (z)	10731
95% USL	12978	99% Percentile (z)	12838

Gamma GOF Test

ProUCL Output - UTL/UPL
(version 5.1.002)

A-D Test Statistic	0.205	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.142	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.651	k star (bias corrected MLE)	2.916
Theta hat (MLE)	1547	Theta star (bias corrected MLE)	1936
nu hat (MLE)	102.2	nu star (bias corrected)	81.65
MLE Mean (bias corrected)	5646	MLE Sd (bias corrected)	3307

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	12444	90% Percentile	10080
95% Hawkins Wixley (HW) Approx. Gamma UPL	12712	95% Percentile	11947
95% WH Approx. Gamma UTL with 95% Coverage	16960	99% Percentile	16001
95% HW Approx. Gamma UTL with 95% Coverage	17768		
95% WH USL	15458	95% HW USL	16062

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.114	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	21599	90% Percentile (z)	10133
95% UPL (t)	13861	95% Percentile (z)	12455
95% USL	18821	99% Percentile (z)	18343

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	12700
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	12700	95% BCA Bootstrap UTL with 95% Coverage	12700
95% UPL	12700	90% Percentile	9223
90% Chebyshev UPL	15246	95% Percentile	10672
95% Chebyshev UPL	19595	99% Percentile	12294
95% USL	12700		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-95-4|ug/l|all_locations|metals|sw6020a|magnesium (mg)|t|)

ProUCL Output - UTL/UPL
(version 5.1.002)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	1750	First Quartile	3668
Second Largest	9520	Median	5570
Maximum	11600	Third Quartile	7290
Mean	5614	SD	2891
Coefficient of Variation	0.515	Skewness	0.517
Mean of logged Data	8.492	SD of logged Data	0.579

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.0907	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	13171	90% Percentile (z)	9319
95% UPL (t)	10913	95% Percentile (z)	10369
95% USL	12471	99% Percentile (z)	12340

Gamma GOF Test

A-D Test Statistic	0.196	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.111	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.705	k star (bias corrected MLE)	2.958
Theta hat (MLE)	1515	Theta star (bias corrected MLE)	1897
nu hat (MLE)	103.7	nu star (bias corrected)	82.84
MLE Mean (bias corrected)	5614	MLE Sd (bias corrected)	3264

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	12328	90% Percentile	9989
95% Hawkins Wixley (HW) Approx. Gamma UPL	12659	95% Percentile	11828
95% WH Approx. Gamma UTL with 95% Coverage	16770	99% Percentile	15817
95% HW Approx. Gamma UTL with 95% Coverage	17686		
95% WH USL	15294	95% HW USL	15990

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	22137	90% Percentile (z)	10237
95% UPL (t)	14087	95% Percentile (z)	12633
95% USL	19240	99% Percentile (z)	18742

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	11600
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	11600	95% BCA Bootstrap UTL with 95% Coverage	11600
95% UPL	11600	90% Percentile	9025
90% Chebyshev UPL	14592	95% Percentile	10248
95% Chebyshev UPL	18659	99% Percentile	11330
95% USL	11600		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-96-5|ug/l|without_mw11|metals|sw6020a|manganese (mn)|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	21.75	First Quartile	104
Second Largest	1110	Median	293
Maximum	1300	Third Quartile	561
Mean	448.1	SD	426
Coefficient of Variation	0.951	Skewness	0.989
Mean of logged Data	5.566	SD of logged Data	1.204

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.856	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.205	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1586	90% Percentile (z)	994.1
95% UPL (t)	1236	95% Percentile (z)	1149
95% USL	1441	99% Percentile (z)	1439

Gamma GOF Test

A-D Test Statistic	0.298	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.063	k star (bias corrected MLE)	0.869
Theta hat (MLE)	421.4	Theta star (bias corrected MLE)	515.5
nu hat (MLE)	27.65	nu star (bias corrected)	22.6
MLE Mean (bias corrected)	448.1	MLE Sd (bias corrected)	480.6

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1548	90% Percentile	1068
95% Hawkins Wixley (HW) Approx. Gamma UPL	1660	95% Percentile	1411
95% WH Approx. Gamma UTL with 95% Coverage	2549	99% Percentile	2216
95% HW Approx. Gamma UTL with 95% Coverage	2934		
95% WH USL	2094	95% HW USL	2340

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6523	90% Percentile (z)	1224
95% UPL (t)	2425	95% Percentile (z)	1895
95% USL	4328	99% Percentile (z)	4307

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	1300
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1300	95% BCA Bootstrap UTL with 95% Coverage	1300
95% UPL	1300	90% Percentile	1078
90% Chebyshev UPL	1774	95% Percentile	1186
95% Chebyshev UPL	2375	99% Percentile	1277
95% USL	1300		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-96-5|ug/l|without_mw11|metals|sw6020a|manganese (mn)|t|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13

ProUCL Output - UTL/UPL
(version 5.1.002)

Minimum	20.6	First Quartile	105
Second Largest	1040	Median	279
Maximum	1380	Third Quartile	650
Mean	435.4	SD	425.1
Coefficient of Variation	0.976	Skewness	1.123
Mean of logged Data	5.514	SD of logged Data	1.228

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.863	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.208	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1571	90% Percentile (z)	980.1
95% UPL (t)	1222	95% Percentile (z)	1135
95% USL	1426	99% Percentile (z)	1424

Gamma GOF Test

A-D Test Statistic	0.271	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.17	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.025	k star (bias corrected MLE)	0.839
Theta hat (MLE)	424.9	Theta star (bias corrected MLE)	518.7
nu hat (MLE)	26.64	nu star (bias corrected)	21.83
MLE Mean (bias corrected)	435.4	MLE Sd (bias corrected)	475.2

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1525	90% Percentile	1046
95% Hawkins Wixley (HW) Approx. Gamma UPL	1637	95% Percentile	1388
95% WH Approx. Gamma UTL with 95% Coverage	2527	99% Percentile	2192
95% HW Approx. Gamma UTL with 95% Coverage	2914		
95% WH USL	2071	95% HW USL	2318

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.152	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6591	90% Percentile (z)	1197
95% UPL (t)	2404	95% Percentile (z)	1870

95% USL	4340	99% Percentile (z)	4317

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	1380
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1380	95% BCA Bootstrap UTL with 95% Coverage	1380
95% UPL	1380	90% Percentile	993.2
90% Chebyshev UPL	1759	95% Percentile	1176
95% Chebyshev UPL	2358	99% Percentile	1339
95% USL	1380		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-96-5|ug/l|all_locations|metals|sw6020a|manganese (mn)|d|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	21.75	First Quartile	115.3
Second Largest	1110	Median	374.5
Maximum	1300	Third Quartile	779.3
Mean	477	SD	423.3
Coefficient of Variation	0.887	Skewness	0.758
Mean of logged Data	5.65	SD of logged Data	1.199

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1583	90% Percentile (z)	1019
95% UPL (t)	1253	95% Percentile (z)	1173
95% USL	1481	99% Percentile (z)	1462

Gamma GOF Test

A-D Test Statistic	0.316	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.151	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.235	Detected data appear Gamma Distributed at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.104	k star (bias corrected MLE)	0.915
Theta hat (MLE)	432.1	Theta star (bias corrected MLE)	521.3
nu hat (MLE)	30.91	nu star (bias corrected)	25.62
MLE Mean (bias corrected)	477	MLE Sd (bias corrected)	498.6

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1606	90% Percentile	1122
95% Hawkins Wixley (HW) Approx. Gamma UPL	1729	95% Percentile	1475
95% WH Approx. Gamma UTL with 95% Coverage	2571	99% Percentile	2298
95% HW Approx. Gamma UTL with 95% Coverage	2960		
95% WH USL	2239	95% HW USL	2524

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6541	90% Percentile (z)	1323
95% UPL (t)	2564	95% Percentile (z)	2045
95% USL	4891	99% Percentile (z)	4632

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	1300
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1300	95% BCA Bootstrap UTL with 95% Coverage	1300
95% UPL	1300	90% Percentile	1062
90% Chebyshev UPL	1791	95% Percentile	1177
95% Chebyshev UPL	2387	99% Percentile	1275
95% USL	1300		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-96-5|ug/l|all_locations|metals|sw6020a|manganese (mn)|t|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	20.6	First Quartile	112.3
Second Largest	1140	Median	368

ProUCL Output - UTL/UPL
(version 5.1.002)

Maximum	1380	Third Quartile	767
Mean	485.7	SD	449.7
Coefficient of Variation	0.926	Skewness	0.816
Mean of logged Data	5.623	SD of logged Data	1.248

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	1661	90% Percentile (z)	1062
95% UPL (t)	1310	95% Percentile (z)	1225
95% USL	1552	99% Percentile (z)	1532

Gamma GOF Test

A-D Test Statistic	0.322	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.163	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.235	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.024	k star (bias corrected MLE)	0.852
Theta hat (MLE)	474.4	Theta star (bias corrected MLE)	570.1
nu hat (MLE)	28.67	nu star (bias corrected)	23.86
MLE Mean (bias corrected)	485.7	MLE Sd (bias corrected)	526.2

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	1683	90% Percentile	1163
95% Hawkins Wixley (HW) Approx. Gamma UPL	1815	95% Percentile	1540
95% WH Approx. Gamma UTL with 95% Coverage	2726	99% Percentile	2427
95% HW Approx. Gamma UTL with 95% Coverage	3153		
95% WH USL	2366	95% HW USL	2678

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	7225	90% Percentile (z)	1370
95% UPL (t)	2727	95% Percentile (z)	2156
95% USL	5339	99% Percentile (z)	5046

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	1380
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	1380	95% BCA Bootstrap UTL with 95% Coverage	1380
95% UPL	1380	90% Percentile	1110
90% Chebyshev UPL	1882	95% Percentile	1224
95% Chebyshev UPL	2515	99% Percentile	1349
95% USL	1380		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7439-97-6|ug/l|without_mw11|metals|sw7470a|mercury|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.05
Maximum Detect	N/A	Maximum Non-Detect	0.05
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7439-97-6|ug/l|without_mw11|metals|sw7470a|mercury|d|) was not processed!

CONC (|7439-97-6|ug/l|without_mw11|metals|sw7470a|mercury|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.05
Maximum Detect	N/A	Maximum Non-Detect	0.05
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

ProUCL Output - UTL/UPL
(version 5.1.002)

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7439-97-6|ug/l|without_mw11|metals|sw7470a|mercury|t|) was not processed!

CONC (|7439-97-6|ug/l|all_locations|metals|sw7470a|mercury|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.05
Maximum Detect	N/A	Maximum Non-Detect	0.05
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7439-97-6|ug/l|all_locations|metals|sw7470a|mercury|d|) was not processed!

CONC (|7439-97-6|ug/l|all_locations|metals|sw7470a|mercury|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.05
Maximum Detect	N/A	Maximum Non-Detect	0.05
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7439-97-6|ug/l|all_locations|metals|sw7470a|mercury|t|) was not processed!

CONC (|7440-02-0|ug/l|without_mw11|metals|sw6020a|nickel|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	9		

ProUCL Output - UTL/UPL
(version 5.1.002)

Number of Detects	11	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	1	Minimum Non-Detect	0.85
Maximum Detect	6.1	Maximum Non-Detect	0.85
Variance Detected	2.273	Percent Non-Detects	15.38%
Mean Detected	2.455	SD Detected	1.508
Mean of Detected Logged Data	0.761	SD of Detected Logged Data	0.523

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.794	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.254	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.208	KM SD	1.443
95% UTL95% Coverage	6.063	95% KM UPL (t)	4.877
90% KM Percentile (z)	4.057	95% KM Percentile (z)	4.582
99% KM Percentile (z)	5.566	95% KM USL	5.572

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.142	SD	1.573
95% UTL95% Coverage	6.344	95% UPL (t)	5.052
90% Percentile (z)	4.158	95% Percentile (z)	4.73
99% Percentile (z)	5.802	95% USL	5.809

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.627	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.257	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.818	k star (bias corrected MLE)	2.837
Theta hat (MLE)	0.643	Theta star (bias corrected MLE)	0.865
nu hat (MLE)	83.99	nu star (bias corrected)	62.42
MLE Mean (bias corrected)	2.455		
MLE Sd (bias corrected)	1.457	95% Percentile of Chisquare (2kstar)	12.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.081

Maximum	6.1	Median	1.6
SD	1.651	CV	0.794
k hat (MLE)	0.847	k star (bias corrected MLE)	0.703
Theta hat (MLE)	2.455	Theta star (bias corrected MLE)	2.959
nu hat (MLE)	22.03	nu star (bias corrected)	18.28
MLE Mean (bias corrected)	2.081	MLE Sd (bias corrected)	2.481
95% Percentile of Chisquare (2kstar)	4.779	90% Percentile	5.217
95% Percentile	7.07	99% Percentile	11.49

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	12.84	16.93	95% Approx. Gamma UPL	7.699	9.165
95% Gamma USL	10.49	13.28			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.208	SD (KM)	1.443
Variance (KM)	2.083	SE of Mean (KM)	0.42
k hat (KM)	2.339	k star (KM)	1.851
nu hat (KM)	60.82	nu star (KM)	48.12
theta hat (KM)	0.944	theta star (KM)	1.193
80% gamma percentile (KM)	3.335	90% gamma percentile (KM)	4.373
95% gamma percentile (KM)	5.368	99% gamma percentile (KM)	7.584

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	7.028	7.278	95% Approx. Gamma UPL	5.013	5.064
95% KM Gamma Percentile	4.579	4.601	95% Gamma USL	6.137	6.287

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.173	Mean in Log Scale	0.571
SD in Original Scale	1.538	SD in Log Scale	0.669
95% UTL95% Coverage	10.56	95% BCA UTL95% Coverage	6.1
95% Bootstrap (%) UTL95% Coverage	6.1	95% UPL (t)	6.096
90% Percentile (z)	4.17	95% Percentile (z)	5.316
99% Percentile (z)	8.384	95% USL	8.408

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.619	95% KM UTL (Lognormal)95% Coverage	8.453
KM SD of Logged Data	0.567	95% KM UPL (Lognormal)	5.304
95% KM Percentile Lognormal (z)	4.723	95% KM USL (Lognormal)	6.968

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.142	Mean in Log Scale	0.513
SD in Original Scale	1.573	SD in Log Scale	0.773

95% UTL95% Coverage	13.15	95% UPL (t)	6.971
90% Percentile (z)	4.494	95% Percentile (z)	5.951
99% Percentile (z)	10.08	95% USL	10.11

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	6.1
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	6.1
95% USL	6.1	95% KM Chebyshev UPL	8.737

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-02-0|ug/l|without_mw11|metals|sw6020a|nickel|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	11		
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	0.85
Maximum Detect	4.7	Maximum Non-Detect	0.85
Variance Detected	1.562	Percent Non-Detects	23.08%
Mean Detected	2.82	SD Detected	1.25
Mean of Detected Logged Data	0.933	SD of Detected Logged Data	0.503

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.923	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.172	Lilliefors GOF Test
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.365	KM SD	1.33
95% UTL95% Coverage	5.919	95% KM UPL (t)	4.826
90% KM Percentile (z)	4.07	95% KM Percentile (z)	4.554
99% KM Percentile (z)	5.461	95% KM USL	5.466

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.267	SD	1.508
95% UTL95% Coverage	6.295	95% UPL (t)	5.057

90% Percentile (z)	4.2	95% Percentile (z)	4.748
99% Percentile (z)	5.776	95% USL	5.782

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.464	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.193	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.973	k star (bias corrected MLE)	3.548
Theta hat (MLE)	0.567	Theta star (bias corrected MLE)	0.795
nu hat (MLE)	99.46	nu star (bias corrected)	70.95
MLE Mean (bias corrected)	2.82		
MLE Sd (bias corrected)	1.497	95% Percentile of Chisquare (2kstar)	14.21

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.111	Mean	2.275
Maximum	4.7	Median	2.5
SD	1.504	CV	0.661
k hat (MLE)	1.582	k star (bias corrected MLE)	1.268
Theta hat (MLE)	1.438	Theta star (bias corrected MLE)	1.794
nu hat (MLE)	41.14	nu star (bias corrected)	32.98
MLE Mean (bias corrected)	2.275	MLE Sd (bias corrected)	2.02
95% Percentile of Chisquare (2kstar)	6.994	90% Percentile	4.94
95% Percentile	6.273	99% Percentile	9.318

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	10.43	12.06	95% Approx. Gamma UPL	6.77	7.358
95% Gamma USL	8.787	9.901			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.365	SD (KM)	1.33
Variance (KM)	1.77	SE of Mean (KM)	0.389
k hat (KM)	3.161	k star (KM)	2.483
nu hat (KM)	82.18	nu star (KM)	64.55
theta hat (KM)	0.748	theta star (KM)	0.953
80% gamma percentile (KM)	3.451	90% gamma percentile (KM)	4.376
95% gamma percentile (KM)	5.248	99% gamma percentile (KM)	7.158

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	7.731	8.188	95% Approx. Gamma UPL	5.482	5.629

95% KM Gamma Percentile	5	5.097	95% Gamma USL	6.736	7.039

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.353	Mean in Log Scale	0.661
SD in Original Scale	1.402	SD in Log Scale	0.682
95% UTL95% Coverage	11.99	95% BCA UTL95% Coverage	4.7
95% Bootstrap (%) UTL95% Coverage	4.7	95% UPL (t)	6.842
90% Percentile (z)	4.644	95% Percentile (z)	5.95
99% Percentile (z)	9.474	95% USL	9.501

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.68	95% KM UTL (Lognormal)95% Coverage	10.42
KM SD of Logged Data	0.623	95% KM UPL (Lognormal)	6.246
95% KM Percentile Lognormal (z)	5.498	95% KM USL (Lognormal)	8.427

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.267	Mean in Log Scale	0.52
SD in Original Scale	1.508	SD in Log Scale	0.897
95% UTL95% Coverage	18.47	95% UPL (t)	8.839
90% Percentile (z)	5.31	95% Percentile (z)	7.356
99% Percentile (z)	13.56	95% USL	13.61

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	4.7
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	4.7
95% USL	4.7	95% KM Chebyshev UPL	8.384

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-02-0|ug/l|all_locations|metals|sw6020a|nickel|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	10		
Number of Detects	12	Number of Non-Detects	2
Number of Distinct Detects	9	Number of Distinct Non-Detects	1

ProUCL Output - UTL/UPL
(version 5.1.002)

Minimum Detect	1	Minimum Non-Detect	0.85
Maximum Detect	11.6	Maximum Non-Detect	0.85
Variance Detected	9.036	Percent Non-Detects	14.29%
Mean Detected	3.217	SD Detected	3.006
Mean of Detected Logged Data	0.902	SD of Detected Logged Data	0.698

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.688	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.318	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	2.879	KM SD	2.79
95% UTL95% Coverage	10.17	95% KM UPL (t)	7.993
90% KM Percentile (z)	6.454	95% KM Percentile (z)	7.468
99% KM Percentile (z)	9.37	95% KM USL	9.496

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.818	SD	2.945
95% UTL95% Coverage	10.52	95% UPL (t)	8.216
90% Percentile (z)	6.592	95% Percentile (z)	7.662
99% Percentile (z)	9.669	95% USL	9.803

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.872	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.741	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.251	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.249	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.029	k star (bias corrected MLE)	1.577
Theta hat (MLE)	1.585	Theta star (bias corrected MLE)	2.039
nu hat (MLE)	48.69	nu star (bias corrected)	37.85
MLE Mean (bias corrected)	3.217		
MLE Sd (bias corrected)	2.561	95% Percentile of Chisquare (2kstar)	8.081

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.759
Maximum	11.6	Median	1.65
SD	3	CV	1.088

ProUCL Output - UTL/UPL
(version 5.1.002)

k hat (MLE)	0.675	k star (bias corrected MLE)	0.578
Theta hat (MLE)	4.085	Theta star (bias corrected MLE)	4.77
nu hat (MLE)	18.91	nu star (bias corrected)	16.19
MLE Mean (bias corrected)	2.759	MLE Sd (bias corrected)	3.628
95% Percentile of Chisquare (2kstar)	4.217	90% Percentile	7.234
95% Percentile	10.06	99% Percentile	16.91

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	18.15	23.88	95% Approx. Gamma UPL	10.76	12.74
95% Gamma USL	15.58	19.85			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.879	SD (KM)	2.79
Variance (KM)	7.786	SE of Mean (KM)	0.779
k hat (KM)	1.064	k star (KM)	0.884
nu hat (KM)	29.8	nu star (KM)	24.75
theta hat (KM)	2.705	theta star (KM)	3.257
80% gamma percentile (KM)	4.676	90% gamma percentile (KM)	6.832
95% gamma percentile (KM)	9.01	99% gamma percentile (KM)	14.11

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	11.38	11.79	95% Approx. Gamma UPL	7.678	7.703
95% KM Gamma Percentile	6.927	6.902	95% Gamma USL	10.12	10.38

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.827	Mean in Log Scale	0.67
SD in Original Scale	2.937	SD in Log Scale	0.875
95% UTL95% Coverage	19.24	95% BCA UTL95% Coverage	11.6
95% Bootstrap (%) UTL95% Coverage	11.6	95% UPL (t)	9.717
90% Percentile (z)	5.996	95% Percentile (z)	8.241
99% Percentile (z)	14.96	95% USL	15.57

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.75	95% KM UTL (Lognormal)95% Coverage	13.98
KM SD of Logged Data	0.722	95% KM UPL (Lognormal)	7.954
95% KM Percentile Lognormal (z)	6.943	95% KM USL (Lognormal)	11.74

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.818	Mean in Log Scale	0.651
SD in Original Scale	2.945	SD in Log Scale	0.905
95% UTL95% Coverage	20.44	95% UPL (t)	10.08
90% Percentile (z)	6.118	95% Percentile (z)	8.5

99% Percentile (z)	15.75	95% USL	16.41

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	11.6
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	11.6
95% USL	11.6	95% KM Chebyshev UPL	15.47

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-02-0|ug/l|all_locations|metals|sw6020a|nickel|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	12		
Number of Detects	11	Number of Non-Detects	3
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	0.85
Maximum Detect	26.1	Maximum Non-Detect	0.85
Variance Detected	50.67	Percent Non-Detects	21.43%
Mean Detected	4.936	SD Detected	7.119
Mean of Detected Logged Data	1.145	SD of Detected Logged Data	0.849

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.501	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.422	Lilliefors GOF Test
5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	4.061	KM SD	6.246
95% UTL95% Coverage	20.39	95% KM UPL (t)	15.51
90% KM Percentile (z)	12.06	95% KM Percentile (z)	14.33
99% KM Percentile (z)	18.59	95% KM USL	18.87

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	3.97	SD	6.532
95% UTL95% Coverage	21.05	95% UPL (t)	15.94
90% Percentile (z)	12.34	95% Percentile (z)	14.71
99% Percentile (z)	19.17	95% USL	19.46

ProUCL Output - UTL/UPL
(version 5.1.002)

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.209	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.311	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.261	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.246	k star (bias corrected MLE)	0.967
Theta hat (MLE)	3.961	Theta star (bias corrected MLE)	5.105
nu hat (MLE)	27.42	nu star (bias corrected)	21.27
MLE Mean (bias corrected)	4.936		
MLE Sd (bias corrected)	5.02	95% Percentile of Chisquare (2kstar)	5.863

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.881
Maximum	26.1	Median	2.7
SD	6.586	CV	1.697
k hat (MLE)	0.448	k star (bias corrected MLE)	0.399
Theta hat (MLE)	8.668	Theta star (bias corrected MLE)	9.717
nu hat (MLE)	12.54	nu star (bias corrected)	11.18
MLE Mean (bias corrected)	3.881	MLE Sd (bias corrected)	6.141
95% Percentile of Chisquare (2kstar)	3.321	90% Percentile	10.96
95% Percentile	16.13	99% Percentile	29.13

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	30.73	40.87	95% Approx. Gamma UPL	16.94	19.93
95% Gamma USL	25.86	33.14			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.061	SD (KM)	6.246
Variance (KM)	39.01	SE of Mean (KM)	1.751
k hat (KM)	0.423	k star (KM)	0.38
nu hat (KM)	11.84	nu star (KM)	10.63
theta hat (KM)	9.606	theta star (KM)	10.69
80% gamma percentile (KM)	6.511	90% gamma percentile (KM)	11.57
95% gamma percentile (KM)	17.18	99% gamma percentile (KM)	31.34

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	19.95	20.46	95% Approx. Gamma UPL	12.5	12.29
95% KM Gamma Percentile	11.04	10.76	95% Gamma USL	17.39	17.59

ProUCL Output - UTL/UPL
(version 5.1.002)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	3.98	Mean in Log Scale	0.73
SD in Original Scale	6.526	SD in Log Scale	1.119
95% UTL95% Coverage	38.72	95% BCA UTL95% Coverage	26.1
95% Bootstrap (%) UTL95% Coverage	26.1	95% UPL (t)	16.16
90% Percentile (z)	8.714	95% Percentile (z)	13.09
99% Percentile (z)	28.06	95% USL	29.52

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	0.864	95% KM UTL (Lognormal)95% Coverage	24.68
KM SD of Logged Data	0.896	95% KM UPL (Lognormal)	12.26
95% KM Percentile Lognormal (z)	10.36	95% KM USL (Lognormal)	19.86

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	3.97	Mean in Log Scale	0.716
SD in Original Scale	6.532	SD in Log Scale	1.131
95% UTL95% Coverage	39.37	95% UPL (t)	16.27
90% Percentile (z)	8.72	95% Percentile (z)	13.15
99% Percentile (z)	28.43	95% USL	29.93

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	26.1
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	26.1
95% USL	26.1	95% KM Chebyshev UPL	32.24

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-09-7|ug/l|without_mw11|metals|sw6020a|potassium (k)|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	1010	First Quartile	1290
Second Largest	3920	Median	1880
Maximum	3940	Third Quartile	2900
Mean	2110	SD	1050
Coefficient of Variation	0.498	Skewness	0.819

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean of logged Data	7.546	SD of logged Data	0.48

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.866	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.186	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4914	90% Percentile (z)	3455
95% UPL (t)	4052	95% Percentile (z)	3837
95% USL	4557	99% Percentile (z)	4553

Gamma GOF Test

A-D Test Statistic	0.481	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.759	k star (bias corrected MLE)	3.712
Theta hat (MLE)	443.3	Theta star (bias corrected MLE)	568.4
nu hat (MLE)	123.7	nu star (bias corrected)	96.51
MLE Mean (bias corrected)	2110	MLE Sd (bias corrected)	1095

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4328	90% Percentile	3578
95% Hawkins Wixley (HW) Approx. Gamma UPL	4384	95% Percentile	4172
95% WH Approx. Gamma UTL with 95% Coverage	5808	99% Percentile	5446
95% HW Approx. Gamma UTL with 95% Coverage	6002		
95% WH USL	5160	95% HW USL	5285

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.155	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6821	90% Percentile (z)	3501
95% UPL (t)	4598	95% Percentile (z)	4168
95% USL	5793	99% Percentile (z)	5781

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	3940
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	3940	95% BCA Bootstrap UTL with 95% Coverage	3940
95% UPL	3940	90% Percentile	3782
90% Chebyshev UPL	5379	95% Percentile	3928
95% Chebyshev UPL	6860	99% Percentile	3938
95% USL	3940		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-09-7|ug/l|without_mw11|metals|sw6020a|potassium (k)|t|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	940.5	First Quartile	1340
Second Largest	3550	Median	1690
Maximum	4440	Third Quartile	2660
Mean	2059	SD	1079
Coefficient of Variation	0.524	Skewness	1.07
Mean of logged Data	7.514	SD of logged Data	0.492

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4942	90% Percentile (z)	3442
95% UPL (t)	4055	95% Percentile (z)	3834
95% USL	4574	99% Percentile (z)	4570

Gamma GOF Test

A-D Test Statistic	0.418	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.197	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.47	k star (bias corrected MLE)	3.49
Theta hat (MLE)	460.5	Theta star (bias corrected MLE)	589.9

nu hat (MLE)	116.2	nu star (bias corrected)	90.74
MLE Mean (bias corrected)	2059	MLE Sd (bias corrected)	1102

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4299	90% Percentile	3536
95% Hawkins Wixley (HW) Approx. Gamma UPL	4351	95% Percentile	4140
95% WH Approx. Gamma UTL with 95% Coverage	5810	99% Percentile	5439
95% HW Approx. Gamma UTL with 95% Coverage	6003		
95% WH USL	5147	95% HW USL	5270

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6829	90% Percentile (z)	3445
95% UPL (t)	4557	95% Percentile (z)	4120
95% USL	5775	99% Percentile (z)	5763

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	4440
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	4440	95% BCA Bootstrap UTL with 95% Coverage	4440
95% UPL	4440	90% Percentile	3440
90% Chebyshev UPL	5419	95% Percentile	3906
95% Chebyshev UPL	6941	99% Percentile	4333
95% USL	4440		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-09-7|ug/l|all_locations|metals|sw6020a|potassium (k)|d|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	1010	First Quartile	1323
Second Largest	3920	Median	1910
Maximum	3940	Third Quartile	2780
Mean	2132	SD	1012
Coefficient of Variation	0.475	Skewness	0.759
Mean of logged Data	7.563	SD of logged Data	0.466

ProUCL Output - UTL/UPL
(version 5.1.002)

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	4778	90% Percentile (z)	3429
95% UPL (t)	3987	95% Percentile (z)	3797
95% USL	4533	99% Percentile (z)	4487

Gamma GOF Test

A-D Test Statistic	0.368	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.229	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.081	k star (bias corrected MLE)	4.04
Theta hat (MLE)	419.5	Theta star (bias corrected MLE)	527.7
nu hat (MLE)	142.3	nu star (bias corrected)	113.1
MLE Mean (bias corrected)	2132	MLE Sd (bias corrected)	1061

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	4258	90% Percentile	3553
95% Hawkins Wixley (HW) Approx. Gamma UPL	4313	95% Percentile	4121
95% WH Approx. Gamma UTL with 95% Coverage	5596	99% Percentile	5334
95% HW Approx. Gamma UTL with 95% Coverage	5772		
95% WH USL	5155	95% HW USL	5285

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	6509	90% Percentile (z)	3499
95% UPL (t)	4524	95% Percentile (z)	4144
95% USL	5814	99% Percentile (z)	5693

Nonparametric Distribution Free Background Statistics

Data appear Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	3940

ProUCL Output - UTL/UPL
(version 5.1.002)

Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	3940	95% BCA Bootstrap UTL with 95% Coverage	3940
95% UPL	3940	90% Percentile	3713
90% Chebyshev UPL	5275	95% Percentile	3927
95% Chebyshev UPL	6699	99% Percentile	3937
95% USL	3940		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-09-7|ug/l|all_locations|metals|sw6020a|potassium (k)|t|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	940.5	First Quartile	1345
Second Largest	4440	Median	1760
Maximum	5520	Third Quartile	2915
Mean	2306	SD	1390
Coefficient of Variation	0.603	Skewness	1.214
Mean of logged Data	7.592	SD of logged Data	0.557

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.862	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.205	Lilliefors GOF Test
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	5939	90% Percentile (z)	4087
95% UPL (t)	4853	95% Percentile (z)	4592
95% USL	5602	99% Percentile (z)	5539

Gamma GOF Test

A-D Test Statistic	0.449	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.185	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.476	k star (bias corrected MLE)	2.779
Theta hat (MLE)	663.3	Theta star (bias corrected MLE)	829.8
nu hat (MLE)	97.33	nu star (bias corrected)	77.8
MLE Mean (bias corrected)	2306	MLE Sd (bias corrected)	1383

ProUCL Output - UTL/UPL
(version 5.1.002)

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	5151	90% Percentile	4160
95% Hawkins Wixley (HW) Approx. Gamma UPL	5221	95% Percentile	4948
95% WH Approx. Gamma UTL with 95% Coverage	7064	99% Percentile	6662
95% HW Approx. Gamma UTL with 95% Coverage	7329		
95% WH USL	6427	95% HW USL	6617

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.171	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	8512	90% Percentile (z)	4051
95% UPL (t)	5509	95% Percentile (z)	4960
95% USL	7437	99% Percentile (z)	7252

Nonparametric Distribution Free Background Statistics

Data appear Approximate Normal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	5520
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	5520	95% BCA Bootstrap UTL with 95% Coverage	5520
95% UPL	5520	90% Percentile	4173
90% Chebyshev UPL	6621	95% Percentile	4818
95% Chebyshev UPL	8576	99% Percentile	5380
95% USL	5520		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-22-4|ug/l|without_mw11|metals|sw6020a|silver|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.12
Maximum Detect	N/A	Maximum Non-Detect	0.12
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

ProUCL Output - UTL/UPL
(version 5.1.002)

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-22-4|ug/l|without_mw11|metals|sw6020a|silver|d|) was not processed!

CONC (|7440-22-4|ug/l|without_mw11|metals|sw6020a|silver|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.12
Maximum Detect	N/A	Maximum Non-Detect	0.12
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-22-4|ug/l|without_mw11|metals|sw6020a|silver|t|) was not processed!

CONC (|7440-22-4|ug/l|all_locations|metals|sw6020a|silver|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.12
Maximum Detect	N/A	Maximum Non-Detect	0.12
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-22-4|ug/l|all_locations|metals|sw6020a|silver|d|) was not processed!

CONC (|7440-22-4|ug/l|all_locations|metals|sw6020a|silver|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		

ProUCL Output - UTL/UPL
(version 5.1.002)

Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.12
Maximum Detect	N/A	Maximum Non-Detect	0.12
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-22-4|ug/l|all_locations|metals|sw6020a|silver|t|) was not processed!

CONC (|7440-23-5|ug/l|without_mw11|metals|sw6020a|sodium (na)|d|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Minimum	8135	First Quartile	14500
Second Largest	63600	Median	22700
Maximum	298000	Third Quartile	34900
Mean	44876	SD	77483
Coefficient of Variation	1.727	Skewness	3.387
Mean of logged Data	10.12	SD of logged Data	0.934

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.469	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.39	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	251834	90% Percentile (z)	144175
95% UPL (t)	188186	95% Percentile (z)	172324
95% USL	225454	99% Percentile (z)	225129

Gamma GOF Test

A-D Test Statistic	1.416	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.289	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.243	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.978	k star (bias corrected MLE)	0.803
Theta hat (MLE)	45904	Theta star (bias corrected MLE)	55865
nu hat (MLE)	25.42	nu star (bias corrected)	20.89

ProUCL Output - UTL/UPL
(version 5.1.002)

MLE Mean (bias corrected)	44876	MLE Sd (bias corrected)	50070

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	149559	90% Percentile	109011
95% Hawkins Wixley (HW) Approx. Gamma UPL	145833	95% Percentile	145359
95% WH Approx. Gamma UTL with 95% Coverage	250183	99% Percentile	231171
95% HW Approx. Gamma UTL with 95% Coverage	255710		
95% WH USL	204290	95% HW USL	204541

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	300488	90% Percentile (z)	82128
95% UPL (t)	139568	95% Percentile (z)	115289
95% USL	218671	99% Percentile (z)	217817

Nonparametric Distribution Free Background Statistics

Data appear Approximate Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	298000
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	298000	95% BCA Bootstrap UTL with 95% Coverage	298000
95% UPL	298000	90% Percentile	58150
90% Chebyshev UPL	286100	95% Percentile	157360
95% Chebyshev UPL	395367	99% Percentile	269872
95% USL	298000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-23-5|ug/l|without_mw11|metals|sw6020a|sodium (na)|t|)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
Minimum	7810	First Quartile	12600
Second Largest	67600	Median	20800
Maximum	297000	Third Quartile	30400
Mean	43966	SD	77627
Coefficient of Variation	1.766	Skewness	3.365
Mean of logged Data	10.07	SD of logged Data	0.96

Critical Values for Background Threshold Values (BTVs)

ProUCL Output - UTL/UPL
(version 5.1.002)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test

Shapiro Wilk Test Statistic	0.47	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.398	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	251309	90% Percentile (z)	143450
95% UPL (t)	187543	95% Percentile (z)	171652
95% USL	224880	99% Percentile (z)	224555

Gamma GOF Test

A-D Test Statistic	1.433	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.301	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.244	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.93	k star (bias corrected MLE)	0.767
Theta hat (MLE)	47252	Theta star (bias corrected MLE)	57321
nu hat (MLE)	24.19	nu star (bias corrected)	19.94
MLE Mean (bias corrected)	43966	MLE Sd (bias corrected)	50201

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	148846	90% Percentile	107994
95% Hawkins Wixley (HW) Approx. Gamma UPL	145112	95% Percentile	144799
95% WH Approx. Gamma UTL with 95% Coverage	251137	99% Percentile	232006
95% HW Approx. Gamma UTL with 95% Coverage	257198		
95% WH USL	204412	95% HW USL	204891

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.234	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	305812	90% Percentile (z)	80521
95% UPL (t)	138941	95% Percentile (z)	114141
95% USL	220519	99% Percentile (z)	219633

Nonparametric Distribution Free Background Statistics

Data appear Approximate Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	13	95% UTL with 95% Coverage	297000
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487

		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	297000	95% BCA Bootstrap UTL with 95% Coverage	297000
95% UPL	297000	90% Percentile	60850
90% Chebyshev UPL	285640	95% Percentile	159360
95% Chebyshev UPL	395110	99% Percentile	269472
95% USL	297000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-23-5|ug/l|all_locations|metals|sw6020a|sodium (na)|d|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Minimum	8135	First Quartile	14550
Second Largest	101000	Median	23500
Maximum	298000	Third Quartile	35988
Mean	48885	SD	75940
Coefficient of Variation	1.553	Skewness	3.129
Mean of logged Data	10.22	SD of logged Data	0.972

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test

Shapiro Wilk Test Statistic	0.544	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.351	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	247391	90% Percentile (z)	146205
95% UPL (t)	188089	95% Percentile (z)	173794
95% USL	228987	99% Percentile (z)	225547

Gamma GOF Test

A-D Test Statistic	1.133	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.235	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1	k star (bias corrected MLE)	0.833
Theta hat (MLE)	48895	Theta star (bias corrected MLE)	58673
nu hat (MLE)	27.99	nu star (bias corrected)	23.33
MLE Mean (bias corrected)	48885	MLE Sd (bias corrected)	53556

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	162022	90% Percentile	117704
95% Hawkins Wixley (HW) Approx. Gamma UPL	160641	95% Percentile	156283
95% WH Approx. Gamma UTL with 95% Coverage	264247	99% Percentile	247099
95% HW Approx. Gamma UTL with 95% Coverage	274980		
95% WH USL	228934	95% HW USL	234505

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	348414	90% Percentile (z)	95394
95% UPL (t)	163074	95% Percentile (z)	135803
95% USL	275279	99% Percentile (z)	263418

Nonparametric Distribution Free Background Statistics

Data appear Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	298000
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	298000	95% BCA Bootstrap UTL with 95% Coverage	298000
95% UPL	298000	90% Percentile	89780
90% Chebyshev UPL	284700	95% Percentile	169950
95% Chebyshev UPL	391516	99% Percentile	272390
95% USL	298000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-23-5|ug/l|all_locations|metals|sw6020a|sodium (na)|t|)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
Minimum	7810	First Quartile	13300
Second Largest	110000	Median	22100
Maximum	297000	Third Quartile	32988
Mean	48683	SD	76642
Coefficient of Variation	1.574	Skewness	3.028
Mean of logged Data	10.18	SD of logged Data	1.011

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

ProUCL Output - UTL/UPL
(version 5.1.002)

Normal GOF Test

Shapiro Wilk Test Statistic	0.553	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	249024	90% Percentile (z)	146903
95% UPL (t)	189174	95% Percentile (z)	174747
95% USL	230450	99% Percentile (z)	226978

Gamma GOF Test

A-D Test Statistic	1.168	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.276	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.236	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.942	k star (bias corrected MLE)	0.787
Theta hat (MLE)	51703	Theta star (bias corrected MLE)	61824
nu hat (MLE)	26.36	nu star (bias corrected)	22.05
MLE Mean (bias corrected)	48683	MLE Sd (bias corrected)	54862

Background Statistics Assuming Gamma Distribution

95% Wilson Hilferty (WH) Approx. Gamma UPL	164870	90% Percentile	118828
95% Hawkins Wixley (HW) Approx. Gamma UPL	163766	95% Percentile	158825
95% WH Approx. Gamma UTL with 95% Coverage	271628	99% Percentile	253397
95% HW Approx. Gamma UTL with 95% Coverage	284040		
95% WH USL	234672	95% HW USL	241335

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Background Statistics assuming Lognormal Distribution

95% UTL with 95% Coverage	368631	90% Percentile (z)	95882
95% UPL (t)	167427	95% Percentile (z)	138421
95% USL	288548	99% Percentile (z)	275634

Nonparametric Distribution Free Background Statistics

Data appear Lognormal at 5% Significance Level

Nonparametric Upper Limits for Background Threshold Values

Order of Statistic, r	14	95% UTL with 95% Coverage	297000
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
		Approximate Sample Size needed to achieve specified CC	59
95% Percentile Bootstrap UTL with 95% Coverage	297000	95% BCA Bootstrap UTL with 95% Coverage	297000

95% UPL	297000	90% Percentile	97280
90% Chebyshev UPL	286678	95% Percentile	175450
95% Chebyshev UPL	394482	99% Percentile	272690
95% USL	297000		

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7782-49-2|ug/l|without_mw11|metals|sw6020a|selenium|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.44
Maximum Detect	N/A	Maximum Non-Detect	0.44
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7782-49-2|ug/l|without_mw11|metals|sw6020a|selenium|d|) was not processed!

CONC (|7782-49-2|ug/l|without_mw11|metals|sw6020a|selenium|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.44
Maximum Detect	N/A	Maximum Non-Detect	0.44
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7782-49-2|ug/l|without_mw11|metals|sw6020a|selenium|t|) was not processed!

CONC (|7782-49-2|ug/l|all_locations|metals|sw6020a|selenium|d|)

General Statistics

ProUCL Output - UTL/UPL
(version 5.1.002)

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	0.68	Minimum Non-Detect	0.44
Maximum Detect	0.68	Maximum Non-Detect	0.44
Variance Detected	N/A	Percent Non-Detects	92.86%
Mean Detected	0.68	SD Detected	N/A
Mean of Detected Logged Data	-0.386	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7782-49-2|ug/l|all_locations|metals|sw6020a|selenium|d|) was not processed!

CONC (|7782-49-2|ug/l|all_locations|metals|sw6020a|selenium|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	0.89	Minimum Non-Detect	0.44
Maximum Detect	0.89	Maximum Non-Detect	0.44
Variance Detected	N/A	Percent Non-Detects	92.86%
Mean Detected	0.89	SD Detected	N/A
Mean of Detected Logged Data	-0.117	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7782-49-2|ug/l|all_locations|metals|sw6020a|selenium|t|) was not processed!

CONC (|7440-28-0|ug/l|without_mw11|metals|sw6020a|thallium|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.16
Maximum Detect	N/A	Maximum Non-Detect	0.16
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-28-0|ug/l|without_mw11|metals|sw6020a|thallium|d|) was not processed!

ProUCL Output - UTL/UPL
(version 5.1.002)

CONC (|7440-28-0|ug/l|without_mw11|metals|sw6020a|thallium|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	13
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.16
Maximum Detect	N/A	Maximum Non-Detect	0.16
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-28-0|ug/l|without_mw11|metals|sw6020a|thallium|t|) was not processed!

CONC (|7440-28-0|ug/l|all_locations|metals|sw6020a|thallium|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	0.16
Maximum Detect	N/A	Maximum Non-Detect	0.16
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-28-0|ug/l|all_locations|metals|sw6020a|thallium|d|) was not processed!

CONC (|7440-28-0|ug/l|all_locations|metals|sw6020a|thallium|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	2		
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Minimum Detect	0.27	Minimum Non-Detect	0.16
Maximum Detect	0.27	Maximum Non-Detect	0.16
Variance Detected	N/A	Percent Non-Detects	92.86%

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean Detected	0.27	SD Detected	N/A
Mean of Detected Logged Data	-1.309	SD of Detected Logged Data	N/A

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable CONC (|7440-28-0|ug/l|all_locations|metals|sw6020a|thallium|t|) was not processed!

CONC (|7440-62-2|ug/l|without_mw11|metals|sw6020a|vanadium|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	10		
Number of Detects	9	Number of Non-Detects	4
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	0.2
Maximum Detect	0.55	Maximum Non-Detect	0.2
Variance Detected	0.0118	Percent Non-Detects	30.77%
Mean Detected	0.393	SD Detected	0.109
Mean of Detected Logged Data	-0.97	SD of Detected Logged Data	0.294

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.334	KM SD	0.123
95% UTL95% Coverage	0.664	95% KM UPL (t)	0.562
90% KM Percentile (z)	0.492	95% KM Percentile (z)	0.537
99% KM Percentile (z)	0.621	95% KM USL	0.622

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.303	SD	0.167
95% UTL95% Coverage	0.748	95% UPL (t)	0.611
90% Percentile (z)	0.517	95% Percentile (z)	0.577
99% Percentile (z)	0.691	95% USL	0.691

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.234	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.133	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	13.76	k star (bias corrected MLE)	9.246
Theta hat (MLE)	0.0286	Theta star (bias corrected MLE)	0.0425
nu hat (MLE)	247.6	nu star (bias corrected)	166.4
MLE Mean (bias corrected)	0.393		
MLE Sd (bias corrected)	0.129	95% Percentile of Chisquare (2kstar)	29.5

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0941	Mean	0.32
Maximum	0.55	Median	0.34
SD	0.147	CV	0.46
k hat (MLE)	4.371	k star (bias corrected MLE)	3.414
Theta hat (MLE)	0.0732	Theta star (bias corrected MLE)	0.0937
nu hat (MLE)	113.7	nu star (bias corrected)	88.76
MLE Mean (bias corrected)	0.32	MLE Sd (bias corrected)	0.173
95% Percentile of Chisquare (2kstar)	13.82	90% Percentile	0.552
95% Percentile	0.647	99% Percentile	0.852

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.913	0.962	95% Approx. Gamma UPL	0.674	0.692
95% Gamma USL	0.808	0.842			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.334	SD (KM)	0.123
Variance (KM)	0.0152	SE of Mean (KM)	0.0363
k hat (KM)	7.314	k star (KM)	5.677
nu hat (KM)	190.2	nu star (KM)	147.6
theta hat (KM)	0.0456	theta star (KM)	0.0588
80% gamma percentile (KM)	0.443	90% gamma percentile (KM)	0.521
95% gamma percentile (KM)	0.593	99% gamma percentile (KM)	0.743

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	0.757	0.775	95% Approx. Gamma UPL	0.595	0.601
95% KM Gamma Percentile	0.559	0.563	95% Gamma USL	0.687	0.699

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.329	Mean in Log Scale	-1.195

SD in Original Scale	0.135	SD in Log Scale	0.434
95% UTL95% Coverage	0.966	95% BCA UTL95% Coverage	0.55
95% Bootstrap (%) UTL95% Coverage	0.55	95% UPL (t)	0.676
90% Percentile (z)	0.528	95% Percentile (z)	0.619
99% Percentile (z)	0.832	95% USL	0.833

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-1.167	95% KM UTL (Lognormal)95% Coverage	0.847
KM SD of Logged Data	0.375	95% KM UPL (Lognormal)	0.623
95% KM Percentile Lognormal (z)	0.577	95% KM USL (Lognormal)	0.746

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.303	Mean in Log Scale	-1.38
SD in Original Scale	0.167	SD in Log Scale	0.684
95% UTL95% Coverage	1.563	95% UPL (t)	0.891
90% Percentile (z)	0.604	95% Percentile (z)	0.775
99% Percentile (z)	1.235	95% USL	1.238

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	0.55
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	0.55
95% USL	0.55	95% KM Chebyshev UPL	0.892

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-62-2|ug/l|without_mw11|metals|sw6020a|vanadium|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	12		
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	0.2
Maximum Detect	4.5	Maximum Non-Detect	0.2
Variance Detected	1.454	Percent Non-Detects	7.692%
Mean Detected	0.853	SD Detected	1.206
Mean of Detected Logged Data	-0.665	SD of Detected Logged Data	0.924

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.566	**Shapiro Wilk GOF Test**	

ProUCL Output - UTL/UPL
(version 5.1.002)

5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	0.803	KM SD	1.123
95% UTL95% Coverage	3.802	95% KM UPL (t)	2.879
90% KM Percentile (z)	2.242	95% KM Percentile (z)	2.65
99% KM Percentile (z)	3.415	95% KM USL	3.419

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	0.795	SD	1.173
95% UTL95% Coverage	3.929	95% UPL (t)	2.965
90% Percentile (z)	2.299	95% Percentile (z)	2.725
99% Percentile (z)	3.524	95% USL	3.529

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.174	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.287	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.124	k star (bias corrected MLE)	0.899
Theta hat (MLE)	0.759	Theta star (bias corrected MLE)	0.949
nu hat (MLE)	26.99	nu star (bias corrected)	21.57
MLE Mean (bias corrected)	0.853		
MLE Sd (bias corrected)	0.9	95% Percentile of Chisquare (2kstar)	5.593

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.788
Maximum	4.5	Median	0.3
SD	1.178	CV	1.494
k hat (MLE)	0.811	k star (bias corrected MLE)	0.675
Theta hat (MLE)	0.972	Theta star (bias corrected MLE)	1.168
nu hat (MLE)	21.08	nu star (bias corrected)	17.55
MLE Mean (bias corrected)	0.788	MLE Sd (bias corrected)	0.96
95% Percentile of Chisquare (2kstar)	4.656	90% Percentile	1.996
95% Percentile	2.719	99% Percentile	4.45

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	4.938	5.619	95% Approx. Gamma UPL	2.881	3.04
95% Gamma USL	3.996	4.406			

ProUCL Output - UTL/UPL
(version 5.1.002)

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.803	SD (KM)	1.123
Variance (KM)	1.26	SE of Mean (KM)	0.325
k hat (KM)	0.512	k star (KM)	0.445
nu hat (KM)	13.3	nu star (KM)	11.57
theta hat (KM)	1.569	theta star (KM)	1.805
80% gamma percentile (KM)	1.31	90% gamma percentile (KM)	2.224
95% gamma percentile (KM)	3.215	99% gamma percentile (KM)	5.68

The following statistics are computed using gamma distribution and KM estimates
Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	4.062	4.207	95% Approx. Gamma UPL	2.501	2.476
95% KM Gamma Percentile	2.187	2.144	95% Gamma USL	3.354	3.406

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.828	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.792	Mean in Log Scale	-0.83
SD in Original Scale	1.175	SD in Log Scale	1.065
95% UTL95% Coverage	7.501	95% BCA UTL95% Coverage	4.5
95% Bootstrap (%) UTL95% Coverage	4.5	95% UPL (t)	3.127
90% Percentile (z)	1.708	95% Percentile (z)	2.515
99% Percentile (z)	5.197	95% USL	5.22

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.738	95% KM UTL (Lognormal)95% Coverage	5.1
KM SD of Logged Data	0.886	95% KM UPL (Lognormal)	2.463
95% KM Percentile Lognormal (z)	2.054	95% KM USL (Lognormal)	3.772

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	0.795	Mean in Log Scale	-0.791
SD in Original Scale	1.173	SD in Log Scale	0.994
95% UTL95% Coverage	6.453	95% UPL (t)	2.851
90% Percentile (z)	1.621	95% Percentile (z)	2.326
99% Percentile (z)	4.581	95% USL	4.6

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	4.5
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	4.5
95% USL	4.5	95% KM Chebyshev UPL	5.881

ProUCL Output - UTL/UPL
(version 5.1.002)

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-62-2|ug/l|all_locations|metals|sw6020a|vanadium|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	11		
Number of Detects	10	Number of Non-Detects	4
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	0.2
Maximum Detect	10.1	Maximum Non-Detect	0.2
Variance Detected	9.432	Percent Non-Detects	28.57%
Mean Detected	1.364	SD Detected	3.071
Mean of Detected Logged Data	-0.642	SD of Detected Logged Data	1.074

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.398	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.505	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	1.031	KM SD	2.518
95% UTL95% Coverage	7.613	95% KM UPL (t)	5.647
90% KM Percentile (z)	4.258	95% KM Percentile (z)	5.173
99% KM Percentile (z)	6.889	95% KM USL	7.003

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	1.003	SD	2.623
95% UTL95% Coverage	7.86	95% UPL (t)	5.811
90% Percentile (z)	4.365	95% Percentile (z)	5.318
99% Percentile (z)	7.105	95% USL	7.224

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.407	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.766	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.477	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.278	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.643	k star (bias corrected MLE)	0.516

Theta hat (MLE)	2.123	Theta star (bias corrected MLE)	2.641
nu hat (MLE)	12.85	nu star (bias corrected)	10.33
MLE Mean (bias corrected)	1.364		
MLE Sd (bias corrected)	1.898	95% Percentile of Chisquare (2kstar)	3.922

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.977
Maximum	10.1	Median	0.355
SD	2.633	CV	2.695
k hat (MLE)	0.379	k star (bias corrected MLE)	0.345
Theta hat (MLE)	2.578	Theta star (bias corrected MLE)	2.828
nu hat (MLE)	10.61	nu star (bias corrected)	9.673
MLE Mean (bias corrected)	0.977	MLE Sd (bias corrected)	1.662
95% Percentile of Chisquare (2kstar)	3.018	90% Percentile	2.827
95% Percentile	4.268	99% Percentile	7.949

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	7.566	8.524	95% Approx. Gamma UPL	3.95	4.001
95% Gamma USL	6.275	6.842			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.031	SD (KM)	2.518
Variance (KM)	6.34	SE of Mean (KM)	0.709
k hat (KM)	0.168	k star (KM)	0.179
nu hat (KM)	4.698	nu star (KM)	5.025
theta hat (KM)	6.147	theta star (KM)	5.748
80% gamma percentile (KM)	1.277	90% gamma percentile (KM)	3.11
95% gamma percentile (KM)	5.46	99% gamma percentile (KM)	12.05

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	5.901	5.644	95% Approx. Gamma UPL	3.394	3.101
95% KM Gamma Percentile	2.921	2.646	95% Gamma USL	5.023	4.731

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.62	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.384	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	0.993	Mean in Log Scale	-1.268
SD in Original Scale	2.627	SD in Log Scale	1.384
95% UTL95% Coverage	10.49	95% BCA UTL95% Coverage	10.1

95% Bootstrap (%) UTL95% Coverage	10.1	95% UPL (t)	3.558
90% Percentile (z)	1.658	95% Percentile (z)	2.742
99% Percentile (z)	7.042	95% USL	7.498

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.918	95% KM UTL (Lognormal)95% Coverage	4.989
KM SD of Logged Data	0.966	95% KM UPL (Lognormal)	2.346
95% KM Percentile Lognormal (z)	1.956	95% KM USL (Lognormal)	3.947

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	1.003	Mean in Log Scale	-1.116
SD in Original Scale	2.623	SD in Log Scale	1.186
95% UTL95% Coverage	7.264	95% UPL (t)	2.878
90% Percentile (z)	1.497	95% Percentile (z)	2.302
99% Percentile (z)	5.165	95% USL	5.45

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	10.1
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	10.1
95% USL	10.1	95% KM Chebyshev UPL	12.39

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-62-2|ug/l|all_locations|metals|sw6020a|vanadium|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	13		
Number of Detects	13	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	0.2
Maximum Detect	45.1	Maximum Non-Detect	0.2
Variance Detected	151.9	Percent Non-Detects	7.143%
Mean Detected	4.257	SD Detected	12.33
Mean of Detected Logged Data	-0.321	SD of Detected Logged Data	1.524

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.369	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.441	**Lilliefors GOF Test**

5% Lilliefors Critical Value	0.234	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	3.967	KM SD	11.46
95% UTL95% Coverage	33.92	95% KM UPL (t)	24.97
90% KM Percentile (z)	18.65	95% KM Percentile (z)	22.82
99% KM Percentile (z)	30.63	95% KM USL	31.14

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	3.96	SD	11.89
95% UTL95% Coverage	35.05	95% UPL (t)	25.76
90% Percentile (z)	19.2	95% Percentile (z)	23.52
99% Percentile (z)	31.63	95% USL	32.17

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.329	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.815	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.362	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.254	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.376	k star (bias corrected MLE)	0.34
Theta hat (MLE)	11.33	Theta star (bias corrected MLE)	12.51
nu hat (MLE)	9.767	nu star (bias corrected)	8.846
MLE Mean (bias corrected)	4.257		
MLE Sd (bias corrected)	7.298	95% Percentile of Chisquare (2kstar)	2.987

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.954
Maximum	45.1	Median	0.315
SD	11.9	CV	3.009
k hat (MLE)	0.338	k star (bias corrected MLE)	0.313
Theta hat (MLE)	11.7	Theta star (bias corrected MLE)	12.63
nu hat (MLE)	9.461	nu star (bias corrected)	8.767
MLE Mean (bias corrected)	3.954	MLE Sd (bias corrected)	7.066
95% Percentile of Chisquare (2kstar)	2.825	90% Percentile	11.6
95% Percentile	17.84	99% Percentile	33.97

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	29.91	30.81	95% Approx. Gamma UPL	15.12	14.08
95% Gamma USL	24.6	24.55			

Estimates of Gamma Parameters using KM Estimates

ProUCL Output - UTL/UPL
(version 5.1.002)

Mean (KM)	3.967	SD (KM)	11.46
Variance (KM)	131.3	SE of Mean (KM)	3.188
k hat (KM)	0.12	k star (KM)	0.142
nu hat (KM)	3.356	nu star (KM)	3.97
theta hat (KM)	33.1	theta star (KM)	27.98
80% gamma percentile (KM)	4.115	90% gamma percentile (KM)	11.66
95% gamma percentile (KM)	22.07	99% gamma percentile (KM)	52.61

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	26.99	26.49	95% Approx. Gamma UPL	13.95	12.57
95% KM Gamma Percentile	11.61	10.27	95% Gamma USL	22.33	21.33

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.758	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.236	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	3.955	Mean in Log Scale	-0.56
SD in Original Scale	11.9	SD in Log Scale	1.716
95% UTL95% Coverage	50.7	95% BCA UTL95% Coverage	45.1
95% Bootstrap (%) UTL95% Coverage	45.1	95% UPL (t)	13.27
90% Percentile (z)	5.15	95% Percentile (z)	9.608
99% Percentile (z)	30.95	95% USL	33.45

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	-0.413	95% KM UTL (Lognormal)95% Coverage	29.24
KM SD of Logged Data	1.449	95% KM UPL (Lognormal)	9.428
95% KM Percentile Lognormal (z)	7.177	95% KM USL (Lognormal)	20.58

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	3.96	Mean in Log Scale	-0.463
SD in Original Scale	11.89	SD in Log Scale	1.557
95% UTL95% Coverage	36.86	95% UPL (t)	10.93
90% Percentile (z)	4.631	95% Percentile (z)	8.152
99% Percentile (z)	23.55	95% USL	25.28

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	45.1
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	45.1
95% USL	45.1	95% KM Chebyshev UPL	55.67

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.

Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers and consists of observations collected from clean unimpacted locations.

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-66-6|ug/l|without_mw11|metals|sw6020a|zinc|d|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	4		
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	3.7	Minimum Non-Detect	3.5
Maximum Detect	8	Maximum Non-Detect	3.5
Variance Detected	4.763	Percent Non-Detects	76.92%
Mean Detected	6.067	SD Detected	2.183
Mean of Detected Logged Data	1.753	SD of Detected Logged Data	0.399

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	4.092	KM SD	1.379
95% UTL95% Coverage	7.776	95% KM UPL (t)	6.643
90% KM Percentile (z)	5.86	95% KM Percentile (z)	6.361
99% KM Percentile (z)	7.301	95% KM USL	7.307

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	2.746	SD	2.092
95% UTL95% Coverage	8.334	95% UPL (t)	6.616
90% Percentile (z)	5.427	95% Percentile (z)	6.188
99% Percentile (z)	7.613	95% USL	7.622

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	10.24	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.592	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	61.45	nu star (bias corrected)	N/A

ProUCL Output - UTL/UPL
(version 5.1.002)

MLE Mean (bias corrected)	N/A		
MLE Sd (bias corrected)	N/A	95% Percentile of Chisquare (2kstar)	N/A

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.578
Maximum	8	Median	0.01
SD	2.748	CV	1.742
k hat (MLE)	0.246	k star (bias corrected MLE)	0.241
Theta hat (MLE)	6.403	Theta star (bias corrected MLE)	6.552
nu hat (MLE)	6.408	nu star (bias corrected)	6.262
MLE Mean (bias corrected)	1.578	MLE Sd (bias corrected)	3.215
95% Percentile of Chisquare (2kstar)	2.358	90% Percentile	4.748
95% Percentile	7.723	99% Percentile	15.68

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	17.1	22.51	95% Approx. Gamma UPL	8.007	8.873
95% Gamma USL	12.78	15.7			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.092	SD (KM)	1.379
Variance (KM)	1.902	SE of Mean (KM)	0.468
k hat (KM)	8.804	k star (KM)	6.823
nu hat (KM)	228.9	nu star (KM)	177.4
theta hat (KM)	0.465	theta star (KM)	0.6
80% gamma percentile (KM)	5.32	90% gamma percentile (KM)	6.184
95% gamma percentile (KM)	6.963	99% gamma percentile (KM)	8.585

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	7.859	7.873	95% Approx. Gamma UPL	6.476	6.454
95% KM Gamma Percentile	6.159	6.132	95% Gamma USL	7.265	7.259

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	2.261	Mean in Log Scale	0.318
SD in Original Scale	2.43	SD in Log Scale	1.055
95% UTL95% Coverage	23.04	95% BCA UTL95% Coverage	8
95% Bootstrap (%) UTL95% Coverage	8	95% UPL (t)	9.683
90% Percentile (z)	5.317	95% Percentile (z)	7.802

99% Percentile (z)	16.02	95% USL	16.09

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	1.368	95% KM UTL (Lognormal)95% Coverage	7.922
KM SD of Logged Data	0.263	95% KM UPL (Lognormal)	6.385
95% KM Percentile Lognormal (z)	6.051	95% KM USL (Lognormal)	7.244

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	2.746	Mean in Log Scale	0.835
SD in Original Scale	2.092	SD in Log Scale	0.548
95% UTL95% Coverage	9.967	95% UPL (t)	6.353
90% Percentile (z)	4.653	95% Percentile (z)	5.679
99% Percentile (z)	8.251	95% USL	8.27

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	8
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	8
95% USL	8	95% KM Chebyshev UPL	10.33

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-66-6|ug/l|without_mw11|metals|sw6020a|zinc|t|)

General Statistics

Total Number of Observations	13	Number of Missing Observations	0
Number of Distinct Observations	8		
Number of Detects	7	Number of Non-Detects	6
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	3.7	Minimum Non-Detect	3.5
Maximum Detect	11.3	Maximum Non-Detect	3.5
Variance Detected	9.737	Percent Non-Detects	46.15%
Mean Detected	7.1	SD Detected	3.12
Mean of Detected Logged Data	1.874	SD of Detected Logged Data	0.453

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.671	d2max (for USL)	2.331

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

ProUCL Output - UTL/UPL
(version 5.1.002)

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	5.438	KM SD	2.778
95% UTL95% Coverage	12.86	95% KM UPL (t)	10.58
90% KM Percentile (z)	8.998	95% KM Percentile (z)	10.01
99% KM Percentile (z)	11.9	95% KM USL	11.91

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	4.631	SD	3.546
95% UTL95% Coverage	14.1	95% UPL (t)	11.19
90% Percentile (z)	9.175	95% Percentile (z)	10.46
99% Percentile (z)	12.88	95% USL	12.89

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.445	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.233	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.945	k star (bias corrected MLE)	3.492
Theta hat (MLE)	1.194	Theta star (bias corrected MLE)	2.033
nu hat (MLE)	83.23	nu star (bias corrected)	48.89
MLE Mean (bias corrected)	7.1		
MLE Sd (bias corrected)	3.799	95% Percentile of Chisquare (2kstar)	14.04

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.117
Maximum	11.3	Median	3.7
SD	4.051	CV	0.984
k hat (MLE)	0.445	k star (bias corrected MLE)	0.394
Theta hat (MLE)	9.245	Theta star (bias corrected MLE)	10.45
nu hat (MLE)	11.58	nu star (bias corrected)	10.24
MLE Mean (bias corrected)	4.117	MLE Sd (bias corrected)	6.56
95% Percentile of Chisquare (2kstar)	3.29	90% Percentile	11.66
95% Percentile	17.2	99% Percentile	31.15

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	36.16	52.15	95% Approx. Gamma UPL	19.5	24.39
95% Gamma USL	28.42	38.73			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	5.438	SD (KM)	2.778
Variance (KM)	7.715	SE of Mean (KM)	0.832

k hat (KM)	3.834	k star (KM)	3
nu hat (KM)	99.68	nu star (KM)	78.01
theta hat (KM)	1.419	theta star (KM)	1.813
80% gamma percentile (KM)	7.757	90% gamma percentile (KM)	9.648
95% gamma percentile (KM)	11.41	99% gamma percentile (KM)	15.24

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	14.3	14.59	95% Approx. Gamma UPL	10.77	10.81
95% KM Gamma Percentile	9.995	10	95% Gamma USL	12.76	12.92

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	4.703	Mean in Log Scale	1.278
SD in Original Scale	3.512	SD in Log Scale	0.785
95% UTL95% Coverage	29.24	95% BCA UTL95% Coverage	11.3
95% Bootstrap (%) UTL95% Coverage	11.3	95% UPL (t)	15.34
90% Percentile (z)	9.821	95% Percentile (z)	13.06
99% Percentile (z)	22.31	95% USL	22.38

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	1.587	95% KM UTL (Lognormal)95% Coverage	15.69
KM SD of Logged Data	0.437	95% KM UPL (Lognormal)	10.96
95% KM Percentile Lognormal (z)	10.03	95% KM USL (Lognormal)	13.53

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	4.631	Mean in Log Scale	1.267
SD in Original Scale	3.546	SD in Log Scale	0.753
95% UTL95% Coverage	26.56	95% UPL (t)	14.3
90% Percentile (z)	9.325	95% Percentile (z)	12.26
99% Percentile (z)	20.49	95% USL	20.55

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	13	95% UTL with95% Coverage	11.3
Approx, f used to compute achieved CC	0.684	Approximate Actual Confidence Coefficient achieved by UTL	0.487
Approximate Sample Size needed to achieve specified CC	59	95% UPL	11.3
95% USL	11.3	95% KM Chebyshev UPL	18

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.

ProUCL Output - UTL/UPL
(version 5.1.002)

The use of USL tends to provide a balance between false positives and false negatives provided the data represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-66-6|ug/l|all_locations|metals|sw6020a|zinc|d|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	5		
Number of Detects	4	Number of Non-Detects	10
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	3.7	Minimum Non-Detect	3.5
Maximum Detect	9.7	Maximum Non-Detect	3.5
Variance Detected	6.476	Percent Non-Detects	71.43%
Mean Detected	6.975	SD Detected	2.545
Mean of Detected Logged Data	1.883	SD of Detected Logged Data	0.416

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

KM Mean	4.493	KM SD	1.963
95% UTL95% Coverage	9.623	95% KM UPL (t)	8.091
90% KM Percentile (z)	7.008	95% KM Percentile (z)	7.721
99% KM Percentile (z)	9.059	95% KM USL	9.148

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	3.243	SD	2.738
95% UTL95% Coverage	10.4	95% UPL (t)	8.261
90% Percentile (z)	6.751	95% Percentile (z)	7.746
99% Percentile (z)	9.612	95% USL	9.736

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.271	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.658	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.214	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	8.58	k star (bias corrected MLE)	2.312
Theta hat (MLE)	0.813	Theta star (bias corrected MLE)	3.017
nu hat (MLE)	68.64	nu star (bias corrected)	18.49
MLE Mean (bias corrected)	6.975		
MLE Sd (bias corrected)	4.588	95% Percentile of Chisquare (2kstar)	10.48

ProUCL Output - UTL/UPL
(version 5.1.002)

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.298
Maximum	9.7	Median	0.248
SD	3.371	CV	1.467
k hat (MLE)	0.273	k star (bias corrected MLE)	0.262
Theta hat (MLE)	8.417	Theta star (bias corrected MLE)	8.766
nu hat (MLE)	7.645	nu star (bias corrected)	7.34
MLE Mean (bias corrected)	2.298	MLE Sd (bias corrected)	4.488
95% Percentile of Chisquare (2kstar)	2.502	90% Percentile	6.872
95% Percentile	10.97	99% Percentile	21.79

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	23.77	32.8	95% Approx. Gamma UPL	11.83	13.87
95% Gamma USL	19.46	25.6			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.493	SD (KM)	1.963
Variance (KM)	3.852	SE of Mean (KM)	0.606
k hat (KM)	5.24	k star (KM)	4.165
nu hat (KM)	146.7	nu star (KM)	116.6
theta hat (KM)	0.857	theta star (KM)	1.079
80% gamma percentile (KM)	6.166	90% gamma percentile (KM)	7.443
95% gamma percentile (KM)	8.617	99% gamma percentile (KM)	11.12

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	9.993	10.06	95% Approx. Gamma UPL	7.946	7.927
95% KM Gamma Percentile	7.498	7.468	95% Gamma USL	9.324	9.356

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	3.06	Mean in Log Scale	0.703
SD in Original Scale	2.933	SD in Log Scale	0.963
95% UTL95% Coverage	25.06	95% BCA UTL95% Coverage	9.7
95% Bootstrap (%) UTL95% Coverage	9.7	95% UPL (t)	11.81
90% Percentile (z)	6.944	95% Percentile (z)	9.853
99% Percentile (z)	19	95% USL	19.84

ProUCL Output - UTL/UPL
(version 5.1.002)

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	1.433	95% KM UTL (Lognormal)95% Coverage	10.29
KM SD of Logged Data	0.344	95% KM UPL (Lognormal)	7.87
95% KM Percentile Lognormal (z)	7.377	95% KM USL (Lognormal)	9.471

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	3.243	Mean in Log Scale	0.938
SD in Original Scale	2.738	SD in Log Scale	0.652
95% UTL95% Coverage	14.04	95% UPL (t)	8.437
90% Percentile (z)	5.889	95% Percentile (z)	7.462
99% Percentile (z)	11.64	95% USL	11.98

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	9.7
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	9.7
95% USL	9.7	95% KM Chebyshev UPL	13.35

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CONC (|7440-66-6|ug/l|all_locations|metals|sw6020a|zinc|t|)

General Statistics

Total Number of Observations	14	Number of Missing Observations	0
Number of Distinct Observations	9		
Number of Detects	8	Number of Non-Detects	6
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	3.7	Minimum Non-Detect	3.5
Maximum Detect	42.4	Maximum Non-Detect	3.5
Variance Detected	164.1	Percent Non-Detects	42.86%
Mean Detected	11.51	SD Detected	12.81
Mean of Detected Logged Data	2.108	SD of Detected Logged Data	0.784

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.614	d2max (for USL)	2.372

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.623	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Kaplan Meier (KM) Background Statistics Assuming Normal Distribution

ProUCL Output - UTL/UPL
(version 5.1.002)

KM Mean	8.079	KM SD	9.888
95% UTL95% Coverage	33.93	95% KM UPL (t)	26.2
90% KM Percentile (z)	20.75	95% KM Percentile (z)	24.34
99% KM Percentile (z)	31.08	95% KM USL	31.53

DL/2 Substitution Background Statistics Assuming Normal Distribution

Mean	7.329	SD	10.65
95% UTL95% Coverage	35.18	95% UPL (t)	26.86
90% Percentile (z)	20.98	95% Percentile (z)	24.85
99% Percentile (z)	32.11	95% USL	32.6

DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.747	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.727	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.28	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.637	k star (bias corrected MLE)	1.106
Theta hat (MLE)	7.034	Theta star (bias corrected MLE)	10.41
nu hat (MLE)	26.19	nu star (bias corrected)	17.7
MLE Mean (bias corrected)	11.51		
MLE Sd (bias corrected)	10.95	95% Percentile of Chisquare (2kstar)	6.397

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.583
Maximum	42.4	Median	3.9
SD	11.1	CV	1.687
k hat (MLE)	0.265	k star (bias corrected MLE)	0.256
Theta hat (MLE)	24.83	Theta star (bias corrected MLE)	25.72
nu hat (MLE)	7.424	nu star (bias corrected)	7.166
MLE Mean (bias corrected)	6.583	MLE Sd (bias corrected)	13.01
95% Percentile of Chisquare (2kstar)	2.46	90% Percentile	19.72
95% Percentile	31.64	99% Percentile	63.26

The following statistics are computed using Gamma ROS Statistics on Imputed Data

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	67.23	97.6	95% Approx. Gamma UPL	33.86	41.56
95% Gamma USL	55.23	76.31			

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	8.079	SD (KM)	9.888
Variance (KM)	97.78	SE of Mean (KM)	2.825
k hat (KM)	0.667	k star (KM)	0.572
nu hat (KM)	18.69	nu star (KM)	16.02

theta hat (KM)	12.1	theta star (KM)	14.12
80% gamma percentile (KM)	13.31	90% gamma percentile (KM)	21.24
95% gamma percentile (KM)	29.57	99% gamma percentile (KM)	49.82

The following statistics are computed using gamma distribution and KM estimates

Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods

	WH	HW		WH	HW
95% Approx. Gamma UTL with 95% Coverage	33.09	33.35	95% Approx. Gamma UPL	22	21.56
95% KM Gamma Percentile	19.76	19.26	95% Gamma USL	29.32	29.28

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.872	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	Lilliefors GOF Test
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects

Mean in Original Scale	7.061	Mean in Log Scale	1.19
SD in Original Scale	10.82	SD in Log Scale	1.303
95% UTL95% Coverage	99.01	95% BCA UTL95% Coverage	42.4
95% Bootstrap (%) UTL95% Coverage	42.4	95% UPL (t)	35.8
90% Percentile (z)	17.45	95% Percentile (z)	28.01
99% Percentile (z)	68.06	95% USL	72.2

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean of Logged Data	1.741	95% KM UTL (Lognormal)95% Coverage	35.32
KM SD of Logged Data	0.697	95% KM UPL (Lognormal)	20.49
95% KM Percentile Lognormal (z)	17.97	95% KM USL (Lognormal)	29.83

Background DL/2 Statistics Assuming Lognormal Distribution

Mean in Original Scale	7.329	Mean in Log Scale	1.444
SD in Original Scale	10.65	SD in Log Scale	0.981
95% UTL95% Coverage	55.13	95% UPL (t)	25.62
90% Percentile (z)	14.91	95% Percentile (z)	21.3
99% Percentile (z)	41.57	95% USL	43.46

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	14	95% UTL with95% Coverage	42.4
Approx, f used to compute achieved CC	0.737	Approximate Actual Confidence Coefficient achieved by UTL	0.512
Approximate Sample Size needed to achieve specified CC	59	95% UPL	42.4
95% USL	42.4	95% KM Chebyshev UPL	52.69

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

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Appendix D

Geophysical Survey Report

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June 01st, 2016

Mark MacEwan, P.E.
Senior Program Director, AECOM
3101 Wilson Boulevard, Suite 900
Arlington, VA 22201
D 703.682.9092; mark.macewan@aecom.com.

Mr. MacEwan:

According to the Scope of Work (SOW) pertaining to supporting the overarching former Camp Hero Remedial Investigation (RI) Work Plan (WP) and other planning documents, AECOM intends to check the sites for indicators of residual utilities or unique subsurface features still in place. As part of the contract, subsurface soil samples and/or groundwater samples are required to be acquired near subsurface pollution source features (e.g., underground storage tanks [USTs], above ground storage tanks [ASTs], fuel pump houses [FPHs], waste dumps) without damaging or puncturing military installation infrastructure. Therefore, prior to the sampling activities, Digital Geophysical Mapping (DGM) surveys were planned as a proactive supplement to narrow down the search areas for specific installation infrastructure of interest for subsequent sampling activities. This process will supplement the local public utilities 1-call services as part of utility mark-outs as those only cover active utilities emplaced by the local government. As part of the DGM survey, the following areas were required for assessment of residual installation infrastructure features within the confines of pre-defined search areas at the Camp Hero facility:

- Tank A – Building 0020 – Fire Department, suspected former UST location(s)
- Tank B – Building 0022 – Kitchen/Office, suspected former UST location(s)
- Tank C – Building 0002 – Barracks, suspected former UST location(s)
- Tank D – Building 104R – Commissary, suspected former UST location(s)
- Tank E – Building 3001 – AT&T/Lilco, suspected former UST location(s)
- Tank F – Building FPH – suspected former UST location(s), hazardous materials
- Tank G – Building FPH – suspected former UST location(s),
- Tank 35 - Building FPH – large AST as part of the pump house(s)
- Vaults – Batteries 0216 – unknown use, potential storage or vaults
- Waste Area – Building 0113 – Plotting Room, potential storage or waste dump site

The intent of the geophysical surveys at each of the above sites is to: (a) verify the outline of a tank (if still exists), (b) identify the extent of residual subsurface features, and (c) examine the general vicinity to support the safe subsurface sampling within close proximity to key features.

1.0 FIELD SURVEY NOTES

The field survey methods consisted of a combination of electromagnetic (EM) Digital Geophysical Mapping (DGM) and magnetic (MAG) Analog Geophysical Mapping (AGM) metal detection surveys, at 5-ft increments, within the bounds of passable areas within the bounds of each pre-marked survey area. The DGM was completed using the Geonics EM61-MK2 in relatively open areas while AGM, using a Schonstedt GA-72cd, was reserved for vegetated areas not maneuverable using DGM methods. After each set of sweeps and/or analyses, interpreted locations were relocated, marked, and annotated as to whether a surface feature coincides. As a footnote, the survey techniques will only verify the rough dimensions of a subsurface metal object, not necessarily verify the object is the tank unless inferences can be made because the expected location of the tank matches the outlined location of the tank. Regardless, the objects identified are large enough and should be avoided during sampling or any subsurface investigation activities. The field survey logbook notes in **Attachment A** catalogues file names, field procedures, and surface features pertinent to the process of interpretation of subsurface metal detection data. The expected locations of the tank(s) along with proposed sampling locations, as excerpted from the WP, are provided in **Attachment B** for reference. Lastly, a summary of field surveys with preliminary interpretations specific to each area are as follows. For reference to the text below, the final interpretation maps are provided in **Attachment C**.

1.1 *Tank A – Building 0020*

The findings are shown in **Figure 1** (i.e. a side-by-side representation of the full-sized map Figures B-1, C-1) and summarized by the following:

- Inferred utility junctions, documented culvert end-points, and confirmed fence-line / building infrastructures are identified on the geophysics map
- UST identified in the Figure B-1 could not be identified in C-1 due to the interference from the fence-line observed on surface, which implies the tank was removed as a tank-sized object was not detected elsewhere on survey data
- No unique features were identified which should require new sampling locations
- Utilities should be avoided during subsurface sampling activities

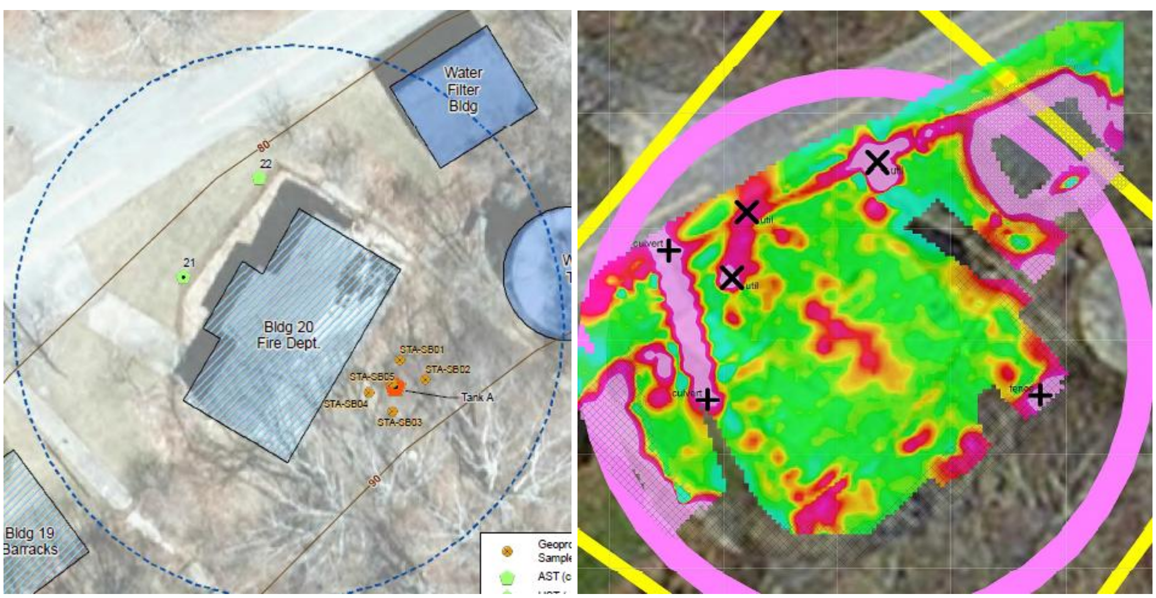

Figure 1. Side-by-Side Representation of Tank A – Building 0020

1.2 *Tank B – Building 0022*

The findings are shown in **Figure 2** (i.e. a side-by-side representation of the full-sized map Figures B-2, C-2) and summarized by the following:

- Inferred utility connections, documented manhole, speed-bump, and well, along with confirmed building infrastructure are identified on the geophysics map
- UST identified in the Figure B-2 appears to be identified in C-2, either in the form of a full-sized tank or the remnant infrastructure associated with the tank
- No unique features were identified which should require new sampling locations
- Utilities should be avoided during subsurface sampling activities

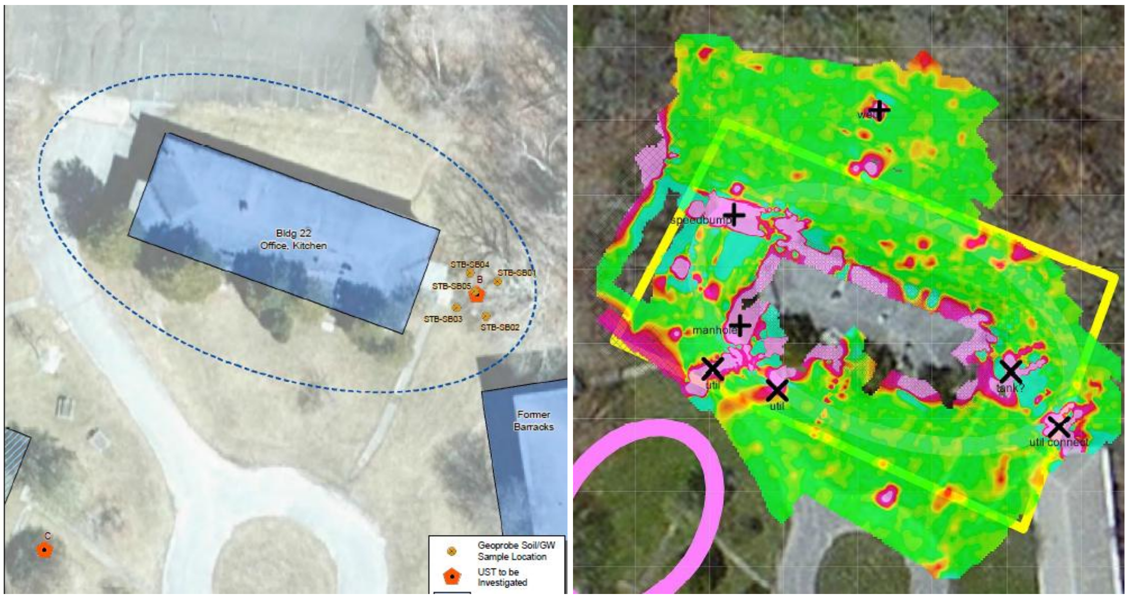

Figure 2. Side-by-Side Representation of Tank B – Building 0022

1.3 *Tank C – Building 0002*

The findings are shown in **Figure 3** (i.e. a side-by-side representation of the full-sized map Figures B-3, C-3) and summarized by the following:

- Inferred utility connections along with debris from former building infrastructure are identified on the geophysics map
- UST identified in the Figure B-3 appears to be identified in C-3, either in the form of a full-sized tank or the remnant infrastructure associated with the tank
- No unique features were identified which should require new sampling locations
- Former building infrastructure and utilities should be avoided during subsurface sampling activities as investigating theses area could damage equipment, along with potentially destroying infrastructure or harming personnel

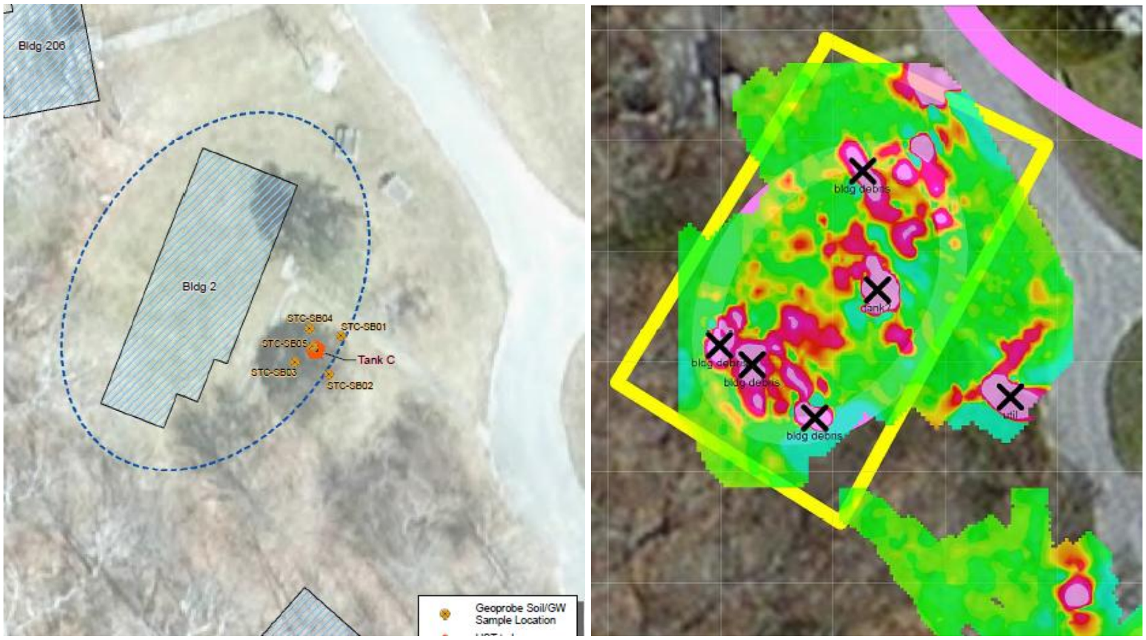

Figure 3. Side-by-Side Representation of Tank C – Building 0002

1.4 *Tank D – Building 104R*

The findings are shown in **Figure 4** (i.e. a side-by-side representation of the full-sized map Figures B-4, C-4) and summarized by the following:

- Inferred abundance of utility connections along with former building and concrete pad infrastructure are identified on the geophysics map
- UST identified in the Figure B-4 could not be identified in C-4, which implies the tank was removed and the tank was not detected elsewhere on survey data
- No unique features were identified which should require new sampling locations
- Former building infrastructure and utilities should be avoided during subsurface sampling activities as investigating theses area could damage equipment, along with potentially destroying infrastructure or harming personnel

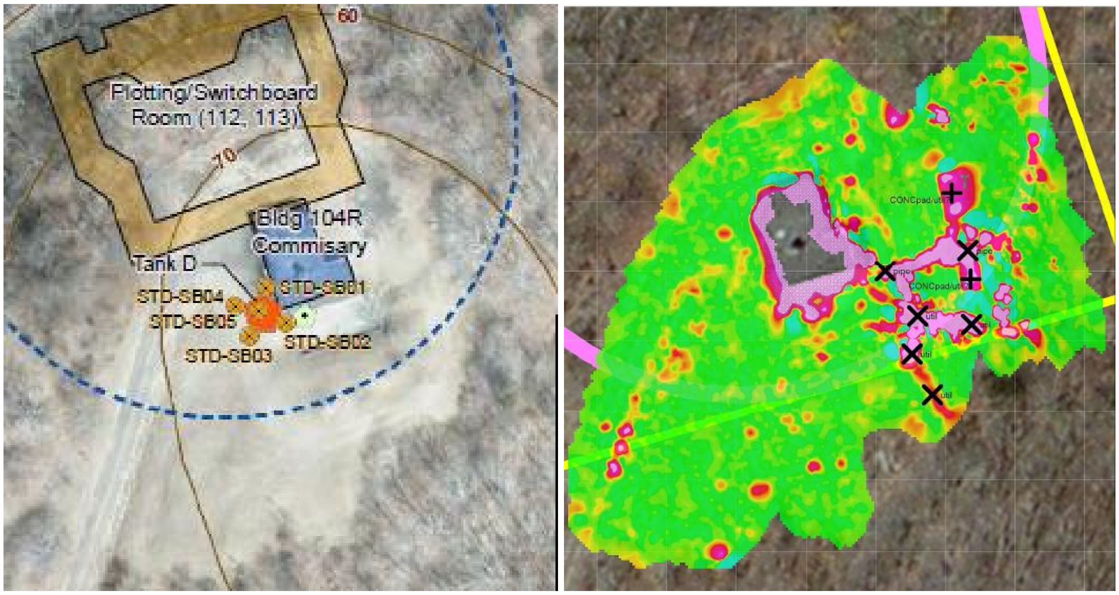

Figure 4. Side-by-Side Representation of Tank D – Building 104R

1.5 *Tank E – Building 3001*

The findings are shown in **Figure 5** (i.e. a side-by-side representation of the full-sized map Figures B-5, C-5) and summarized by the following:

- Confirmed building and fence-line interference, along with verified manholes and telephone pole surface features are identified on the geophysics map
- UST identified in the Figure B-5 could not be identified in C-5 due to the interference from the building, cars, and other metal debris observed on surface
- No unique features were identified which should require new sampling locations
- Current utilities should be avoided if subsurface sampling activities are conducted

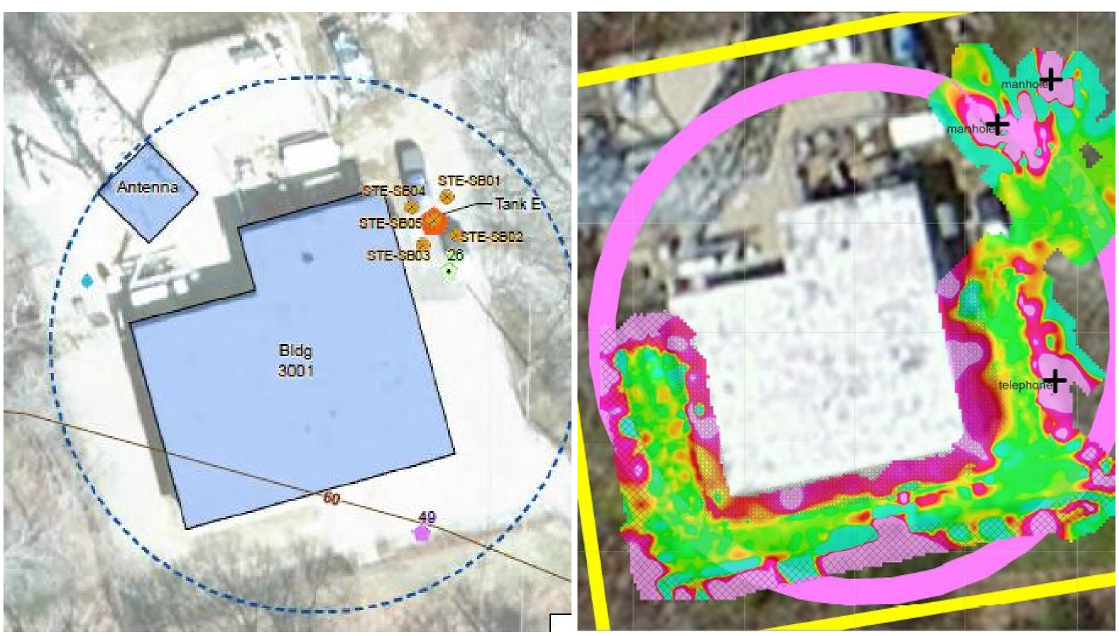

Figure 5. Side-by-Side Representation of Tank E – Building 3001

1.6 *Tank F and Tank G – Pump Houses*

The findings are shown in **Figure 6** (i.e. a side-by-side representation of the full-sized map Figures B-6, B-7, C-6) and summarized by the following:

- Due to dense vegetation and terrain, these area were assessed using AGM and no interferences (e.g., buildings, fences) are identified on the geophysics map
- USTs identified in the Figure B-6/B-7 could not be identified in C-6 due to the fact that a metallic item large enough to represent a UST could not be found and, as such, the USTs are implied to not reside within the bounded areas
- No unique features were identified which should require new sampling locations
- Current features should be avoided if subsurface sampling activities are conducted

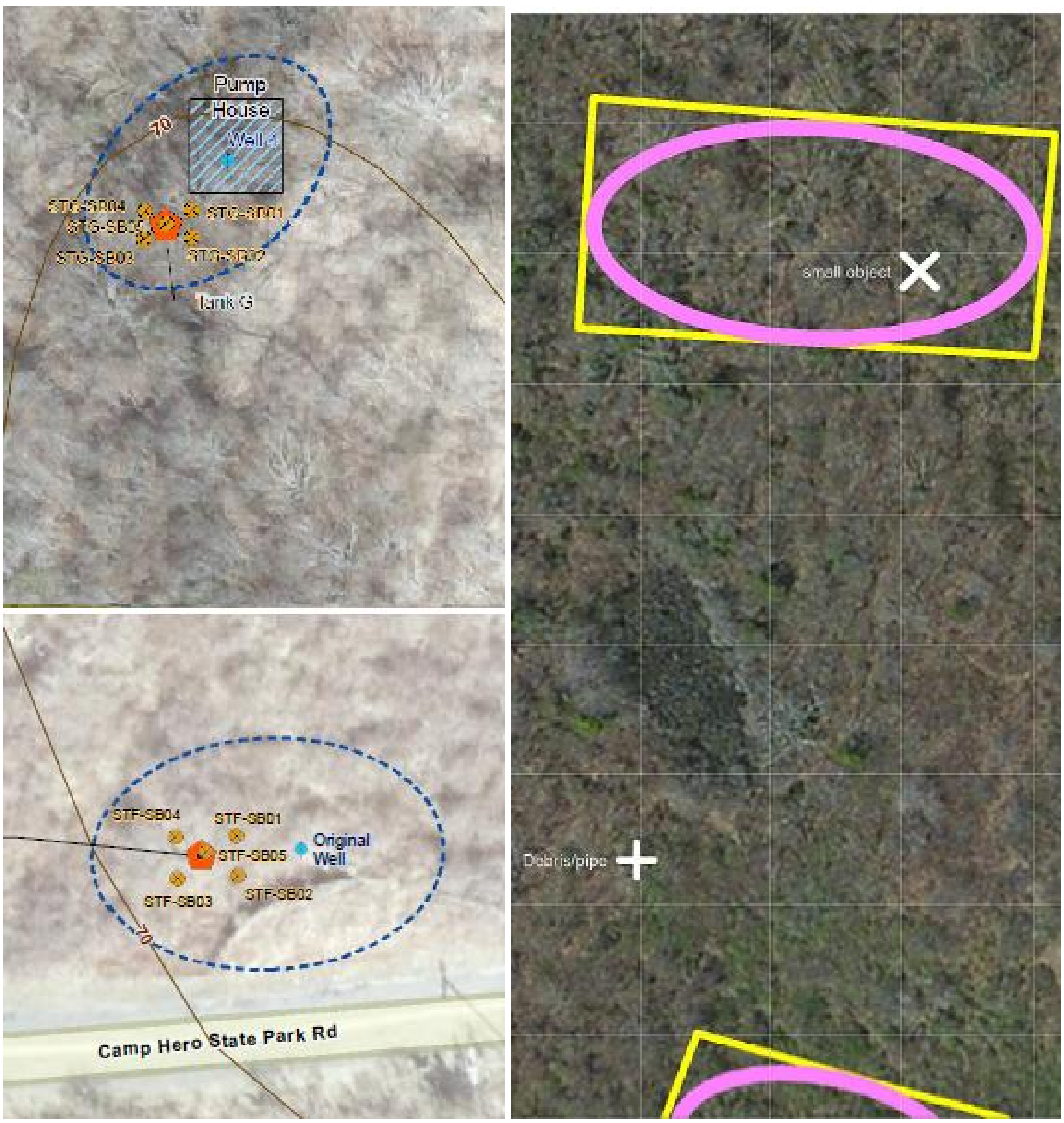

Figure 6. Side-by-Side Representation of Tank F and Tank G – Pump Houses

1.7 *Tank 35 – Fuel Pump House*

The findings are shown in **Figure 7** (i.e. a side-by-side representation of the full-sized map Figures B-8 and C-7) and summarized by the following:

- Confirmed building and fence-line interference, along with fuel piping and fuel pipeline surface features are identified on the geophysics map
- ASTs identified in the Figure B-8 could not be identified in C-7 due to the fact that a structure was an above ground tank and formerly located in a reinforced (with metal rebar) building
- Area west of the building with lots of subsurface anomalies, likely associated with the former fuel pump house infrastructure, should be avoided
- No unique features were identified which should require new sampling locations
- Current features should be avoided if subsurface sampling activities are conducted

Figure 7. Side-by-Side Representation of Tank 35 – Fuel Pump House

1.8 *Storage or Vaults – Battery 216*

The findings are shown in **Figure 8** (i.e. a side-by-side representation of the full-sized map Figures B-9 and C-8) and summarized by the following:

- Confirmed infrastructure interference, as identified on the geophysics map
- USTs identified in the Figure B-9 could not be identified in C-8, likely due to the fact the structures are closed and no longer residing as indicated in DGM data
- Not very many responses of significant size to be considered vaults or storage facilities, mostly debris or infrastructure identified
- No unique features were identified which should require new sampling locations
- Current features should be avoided if subsurface sampling activities are conducted

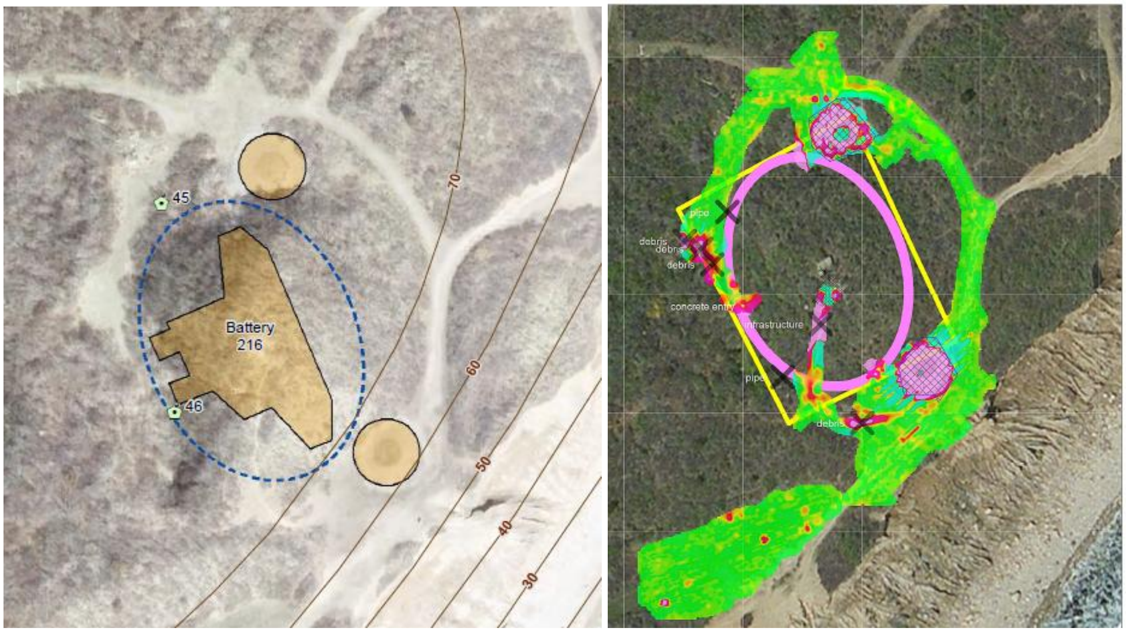

Figure 8. Side-by-Side Representation of Storage or Vaults – Battery 216

1.9 *Waste Area – Building 0113*

The findings are shown in **Figure 9** (i.e. a side-by-side representation of the full-sized map Figures B-10 and C-9) and summarized by the following:

- Two objects and corners of waste area, as identified on the geophysics map
- UST identified in the Figure B-10 could not be identified in C-9, likely due to the fact the structures are closed and no longer residing as indicated in DGM data
- Only one area identified as waste area, remainder of site anomalies too isolated
- No unique features were identified which should require new sampling locations
- Current features should be avoided if subsurface sampling activities are conducted

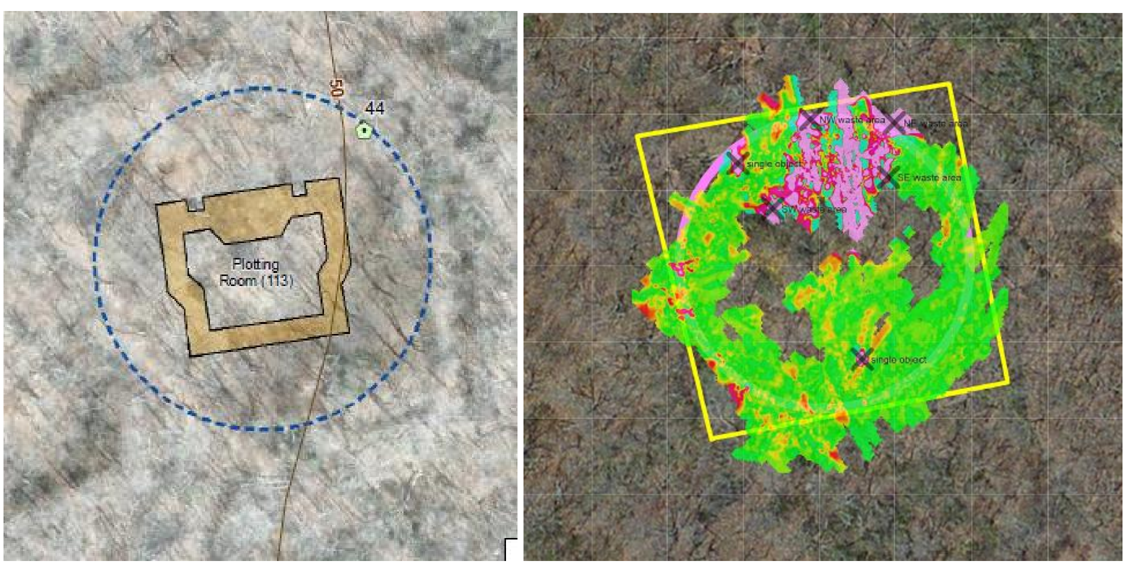

Figure 9. Side-by-Side Representation of Waste Area – Building 113

2.0 APPLICATION SUMMARY OF SURVEY RESULTS

After introducing the side-by-side maps in the previous section, the following is an over-arching summary for the application of the geophysical survey results during sampling activities:

1. Avoid investigating over top of any areas marked-out as infrastructure related (e.g., utilities, buildings, debris) or fuel related (e.g., pipelines, USTs, ASTs);
2. Tank A (Building 0020), Tank D (Building 104R), Tank E (Building 3001), Tank F, Tank G, and Storage Vault (Battery 216) areas *may consider avoiding sampling* as no indications of USTs or other fuel storage within the areas assessed by geophysics;
3. Tank 35 (Building FPH) areas *should consider modifying sampling* as no direct indications of USTs or other significant fuel storage facilities were clearly outlined, but currently standing infrastructure (e.g., building, fencing) and debris were identified to avoid, within the areas assessed by geophysics which overlapped areas expected to contain storage thus requiring careful avoidance;
4. Tank B (Building 0022), Tank C (Building 0002), and Waste Area (Building 113) *should consider maintaining similar sampling patterns* as indications of USTs, UST framework, waste area, and debris were indentified within the areas assessed by geophysics which overlapped areas expected to contain these remnant features; and
5. As a footnote, portions of the Storage Vault (Battery 216) were avoided due to the special plant and vegetation species identified by the AECOM specialist.

The data review results are predicated on sampling in areas deemed necessary while circumventing drilling activities around objects identified within the geophysical survey maps. Anomaly avoidance procedures should be strictly adhered to during sampling activities.

3.0 CONCLUSIONS

In conclusion, areas have been recommended to be separated into three simple categories:

1. Discontinue further sampling due to lack of indications;
2. Modify sampling strategy due to desired sampling locations deemed areas to avoid; and
3. Maintain sampling strategy due to indications of expected remnant features.

If you have any questions or require additional information, please contact the undersigned at your convenience.

Brian S. Brunette, Professional Geophysicist (PGP) in CA & TX

Senior Technical Lead, Munitions Response Geophysics; AECOM

804.873.7517;

brian.brunette@aecom.com

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ATTACHMENT A:

LOGBOOK ENTRIES FROM FIELD GEOPHYSICS TEAM

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May 17, 2016 Camp Hero

Weather: Partly Cloudy with a chance of rain in the late afternoon. High 65°F Low 48°

Crew: Eric Celebrezze (AECOM)
Matt Emmert (URS)

07:00 - Site Safety Brief / Meet with COR & Veg Crew.

07:30 - Setup base station and assemble EM-61.

08:20 - Starting to warm up EM-61 coils. Equipment shake-out.

08:50 - Setup latency test strip.

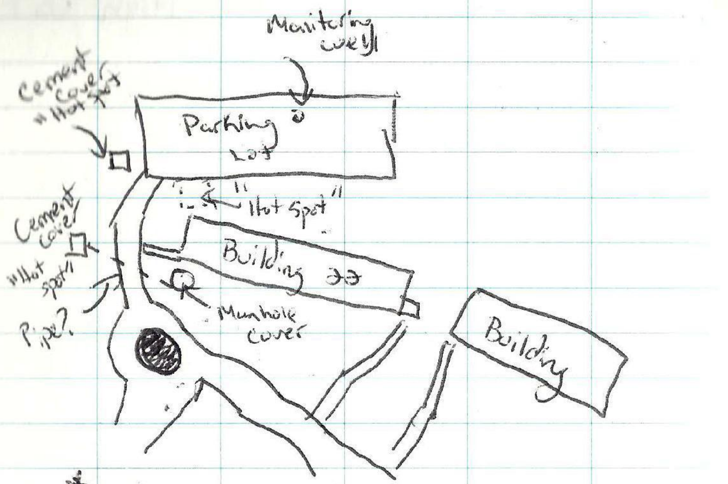
08:52 - Conducting a latency test.
File: 0517lat
Battery: 12.30V

09:08 - Arrive at Bldg 22 for DGM survey.

09:15 - Starting survey
File: 0517BLD22
Battery: 12.30V

10:30 - Finished DGM survey. Three to four hotspots existed that we could audibly hear and at least 1 pipe run was heard while conducting the survey. See map/sketch

May 17, 2Ø16 — Camp Here

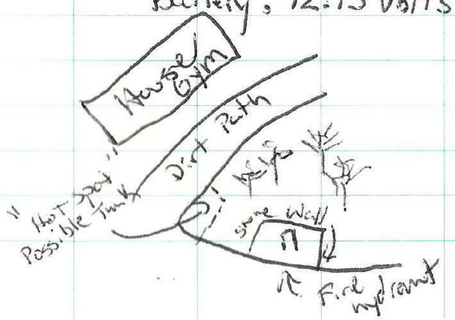


* Note Not to scale

1Ø:55 - Starting DGM survey of the area were building 2 on the map was located. Trees are in the area, survey will be a bit choppy in coverage to avoid obsticles

File: Ø517 BlG2

Battery: 12.15 Volts



*Note Not to Scale

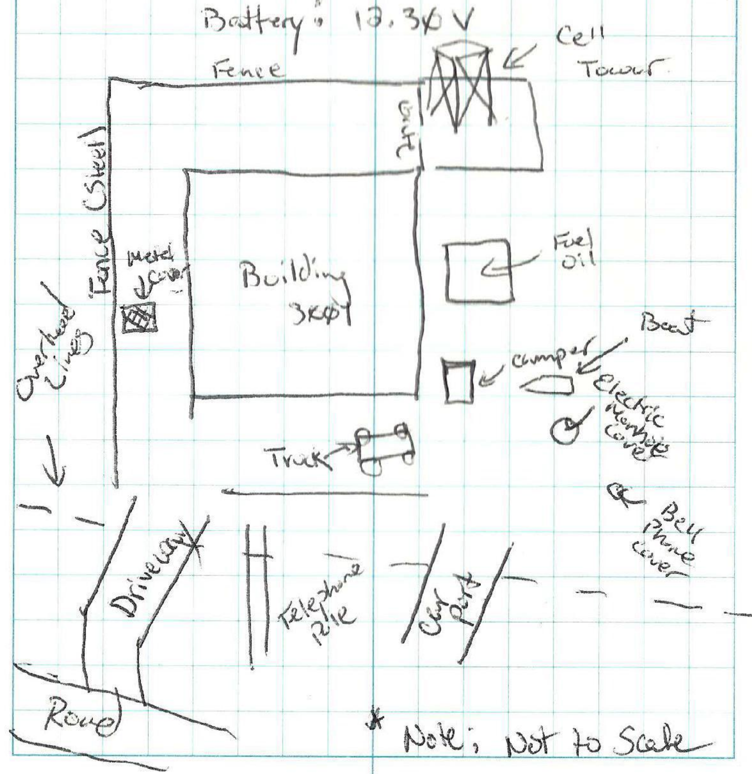
May 17, 2Ø16 — Camp Here

12:5Ø - Arrive at Bldg 3ØØ1 were there is a radio tower in the back corner. Switching the batteries in the EM-61. There is also pockets of cultural debris on the property. A steel fence surrounds the compound.

1255 - Starting DGM survey.

File: Ø517 cop

Battery: 12.3Ø V



* Note: Not to Scale

May 17, 2016 Camp Hero

14:30 - At the fuel pump house to check out veg clearance. Talked to Nicole and suggested a few more clearance locations for option DGM survey results.

14:55 - At the base station conducting a pm latency test.

File: 0517latp

Battery: 12.30 volts

15:00 - Breaking down GPS base station and EM-61 equipment.

15:30 - Left site to process data

END OF REPORT

5/17/16

5/17/16

May 18, 2016 Camp Hero

Weather: Partly Cloudy with a 10% chance of rain. High of 61°F and a low of 47°F. Low UV index.

Crew: Eric Celebrezze (AECOM)

Matt Emmert (URS)

07:15 - Site Safety Meeting

08:00 - Started to setup GPS base station

08:25 - Warming up EM-61 for AM latency tests.

08:40 - Starting AM latency test

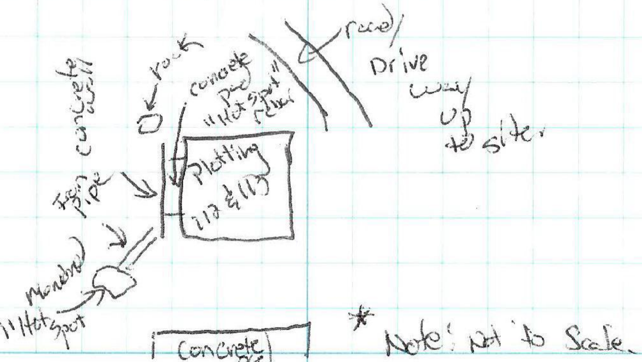
File: 0518latam

Battery: 12.45V

08:52 - At Plotter 112 & 113 for DGM survey.

File: 0518.Plot 112

Battery: 12.45 Volts



* Note: Not to Scale.

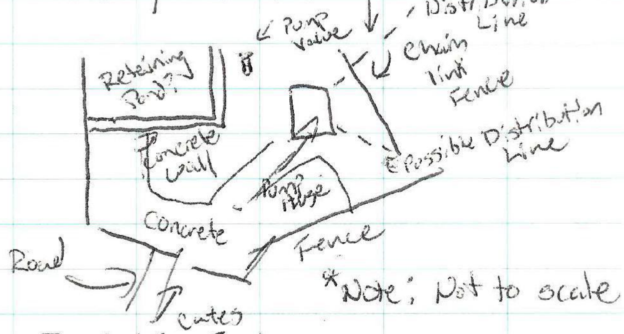
May 18, 2016 Camp Hero

11:50 - Walked Plotting Room 113 to check for veg removed of site. Marked off areas that need to be removed more.

12:10 - Meet with Nicole to explain what veg removal team needs to do in order to conduct DGM survey.

13:15 - At the fuel pump house to begin DGM survey.

File: 0518Fuel
Battery: 12.50V



*Note: Not to scale

File: 0518Fuela
Battery: 12.50V

This file was created due to GPS turning off sometime during the DGM survey.

14:52 - At building 2 site to fill in more DGM survey.

File: 0518Bld2
Battery: 12.30V

May 18, 2016 Camp Hero

16:04 - Starting closing (pm) latency test.

File: 0518latpm
Battery: 12.15V

16:06 - Starting breakdown of equipment.

16:30 - Leaving site to process/download data.

END OF REPORT

5/18/16

5/18/16

May 19, 2Ø16 Camp Hero

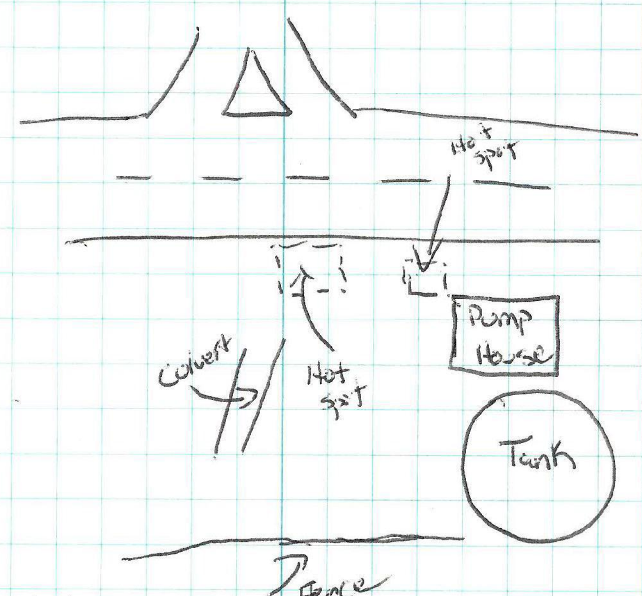
Weather: Cloudy with early AM rain. High of 61°F. Low of 47°F. Low UV index.

Crew: Eric Celebrezze (AECOM)
Matt Emmert (URS)

Ø7:ØØ - On site for site safety meeting.
Ø7:3Ø - Setup the GPS base station and start EM-61 startup.
Ø8:ØØ - Warming up coils for about 15 minutes for AM latency test.
Ø8:15 - Morning latency test
File: Ø519 latam
Battery: 12.6ØV
Ø8:25 - At Plotting 113 doing site walk before starting survey.
Ø8:35 - Starting DGM survey
File: Ø519 Plot 113a
Battery: 12.6ØV
1Ø:1Ø - Finished First Section of Plotting 113 Called Brian about previous days data. Only Bldg 2 additional has been processed.
1Ø:3Ø - Used GPS to determine the area provided to be DGM Plotting 113 is not correct. Plot 113 is now located using the centroid point.

May 19, 2Ø16 Camp Hero

1Ø:3Ø - Veg removal crew was called to come to area and remove veg around the Bunker of 113. Top of bunker will be mag/flag. for anomalies.
11:4Ø - At Fire house to conduct DGM survey to locate tanks.
File: Ø519 Fire
Battery: 12.3ØV



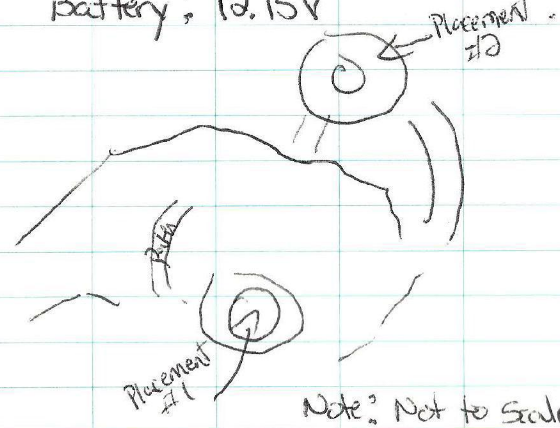
* Note: Not to Scale.

May 19, 2016 Camp Hero

13:00 At Battery 216 for DGM survey.

File: 0519 216

Battery: 12.15V



Note: Not to Scale

14:40 - Stopping DGM survey at Battery 216 to meet Nicole at Plotting 213 AOC to check on veg clearance.

15:15 - Going to conduct a DGM survey on an outer and inner boundry of where the EM-61 can collect data at Plotting Room 113.

File: 0519 Plot 113 ~~Room~~

Battery: 12.00V

15:45 - Conducting PM latency test

File: 0519 latpm

Battery: 12.00V

May 19, 2016 Camp Hero

16:00 - Breaking down GPS base station and packaging up all equipment.

16:30 - Heading out / off-site to download and preprocess todays data.

END of REPORT

ENC 5/19/16

5/19/16 [signature]

May 2Ø, 2Ø16 Camp Hero

Weather: Cloudy with a High of 60°F and a low of 47°F. Low UV Index today. Turning to Mostly Sunny.

Crew: Eric Celebrezze (AECOM)
Matt Emmert (URS)

Ø7:ØØ - Site Safety Meeting

Ø7:3Ø - Setting up GPS base station and assemble EM-61 MK2.

Ø7:45 - Started warming up EM-61 coils for morning latency test.

Ø7:55 - Starting morning latency.
File: Ø52Ø latam
Battery: 12.6Ø V

Ø8:ØØ - Heading to Plotting Room 113 to finish DGM survey in that area. Tree cover will be a concern for data collection and we will increase overlap and break into small pieces to achieve maximum coverage.

Ø8:Ø5 - Starting Plotting Room 113
File: Ø52Ø Plot 113
Battery: 12.60V

11:15 - At Battery 216 to finish up DGM survey started yesterday
File: Ø52Ø Bat 216
Battery: 12.60V

May 2Ø, 2Ø16 Camp Hero

12:Ø2 - Finishing another front section of Battery 216.
File: Ø52Ø Bat 216a
Battery: 12.45 V

12:35 - All areas open to DGM survey have been collected at Battery 216.

12:45 - At the base station / latency test strip to close out DGM survey.
File: Ø52Ø latpm
Battery: 12.45 V

13:ØØ Started Analog geophysical survey of Battery 113.

16:ØØ - Started to break down gps base station.

May 20, 2016 Camp Hero

16:30 - Off-site to download and pre process data.

END OF REPORT

EWC 5/20/16

[signature] 5/20/16

Weather: High of 67°F and low of 51°F. Partly Sunny with a low UV index. 17% Chance of Rain in the afternoon.

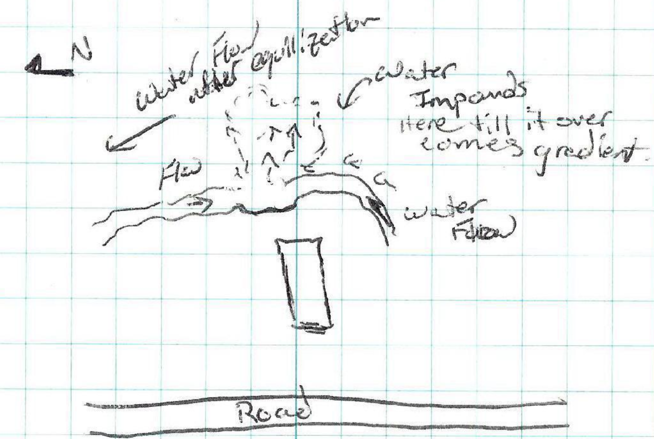
Crew: Eric Celebrezze (AECOM)
Matt Emmert (URS)
Nicole Schulman (URS)

07:00 - Morning Site Safety Meeting.

07:15 - Setup GPS base station

07:30 - GPS is initialized and ready for relocates.

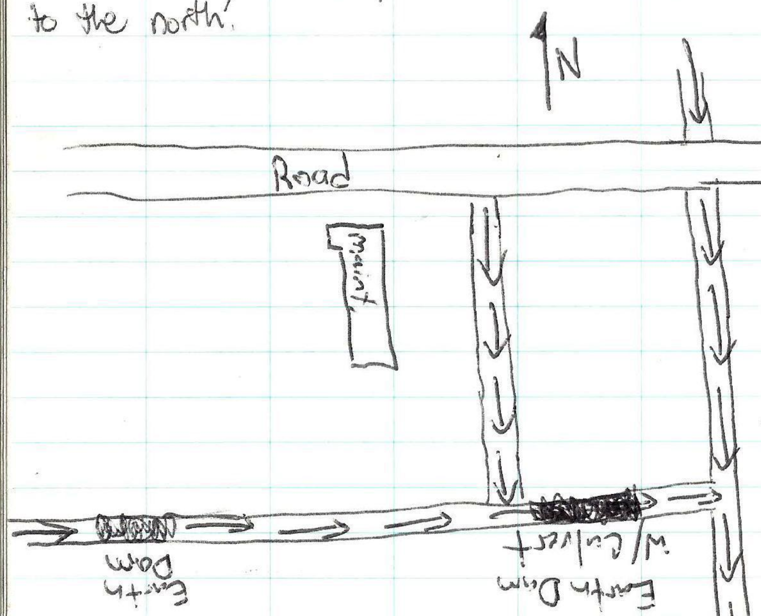
07:40 - Went to GPS culvert/stream sediment however could not get a GPS lock in the stream to take an accurate measurement.



* Note: Not to scale.

May 23, 2016 Camp Hero

08:50 - The general flow of the stream is to the north past behind the maintence building. However, directly behind the building is a slight elevation that heeds to the south. Under storm conditions it is safe to assume the water impounds inbetween these two areas. A lack of plant life supports this assumption of water impoundment. It is also probable that once the gradient has been overcome by the impounded water flow resumes to the north.

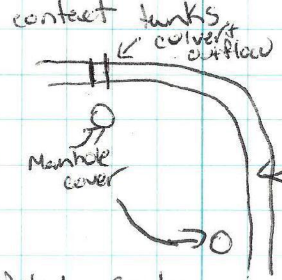


*Note: Not to Scale

May 23, 2016 Camp Hero

09:50 - GPS Well near Battery 113. Found pipe coming out of the ground well concrete debris around it.

10:30 - GPS Two (2) wells near the chlorine contact tanks.



*Note: Not to Scale.

12:00 - Start Analog Survey of Battery 216. Marked out 3 additional locations of possible tanks.

13:00 - Conducting survey of AGP4. Found a pipe and what used to be a manhole that has eroded away.

14:00 - Nicole Schulman off site.

15:02 - Removing V4 off list as it is concrete/rebar.

15:29 - B3 is Manhole cover Removing from list.

15:39 - E3 is Manhole cover Removing from list. E1 is telephone pole with wires. Removed.

May 23, 2016 Camp Hro.

16:37 - A6 was fence and removed from list

16:45 - Breaking down GPS base station and packing away equipment.

GPS Points from survey

ID	Northing	Easting
Chlorine Well	334016.166	1572416.264
Chlorine Well-2	334417.019	1572437.312
Well @ Batt 113	334942.167	1573335.970
Pipe 1	333456.271	1570156.846
Pipe 2	333447.059	1570150.304

1700 - off-site

END OF REPORT

EWC 5/23/16

5/23/16 [signature]

ATTACHMENT B:

EXCERPTED WP MAPS SHOWING PLANNED SAMPLING LOCATIONS and EXPECTED LOCATIONS OF INSTALLATION INFRASTRUCTURE

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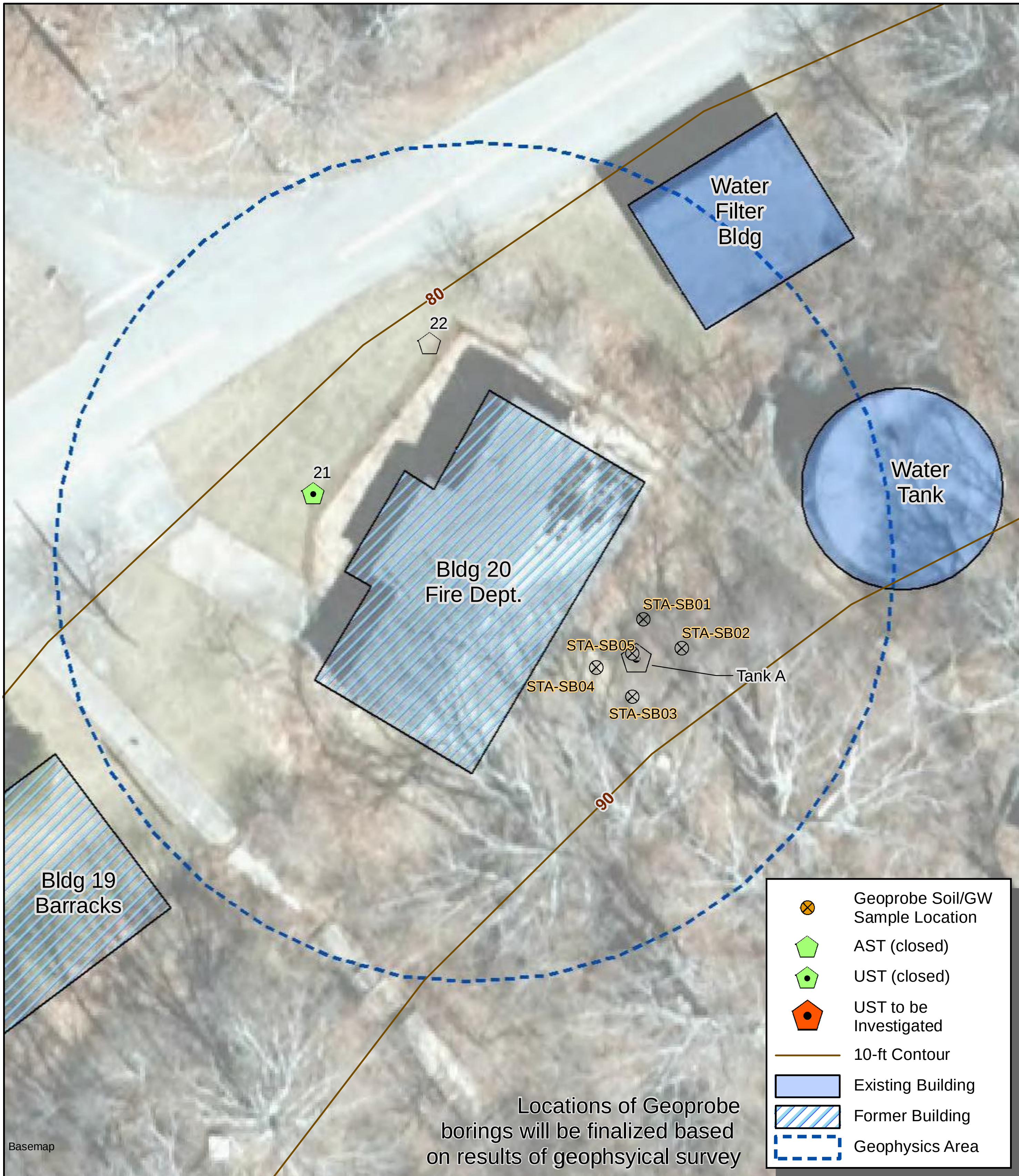
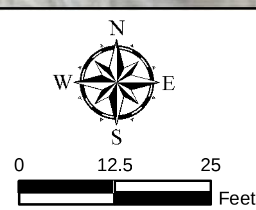


MAP LOCATION



1 inch = 25 feet

NAD 1983 StatePlane Long Island FIPS 3104

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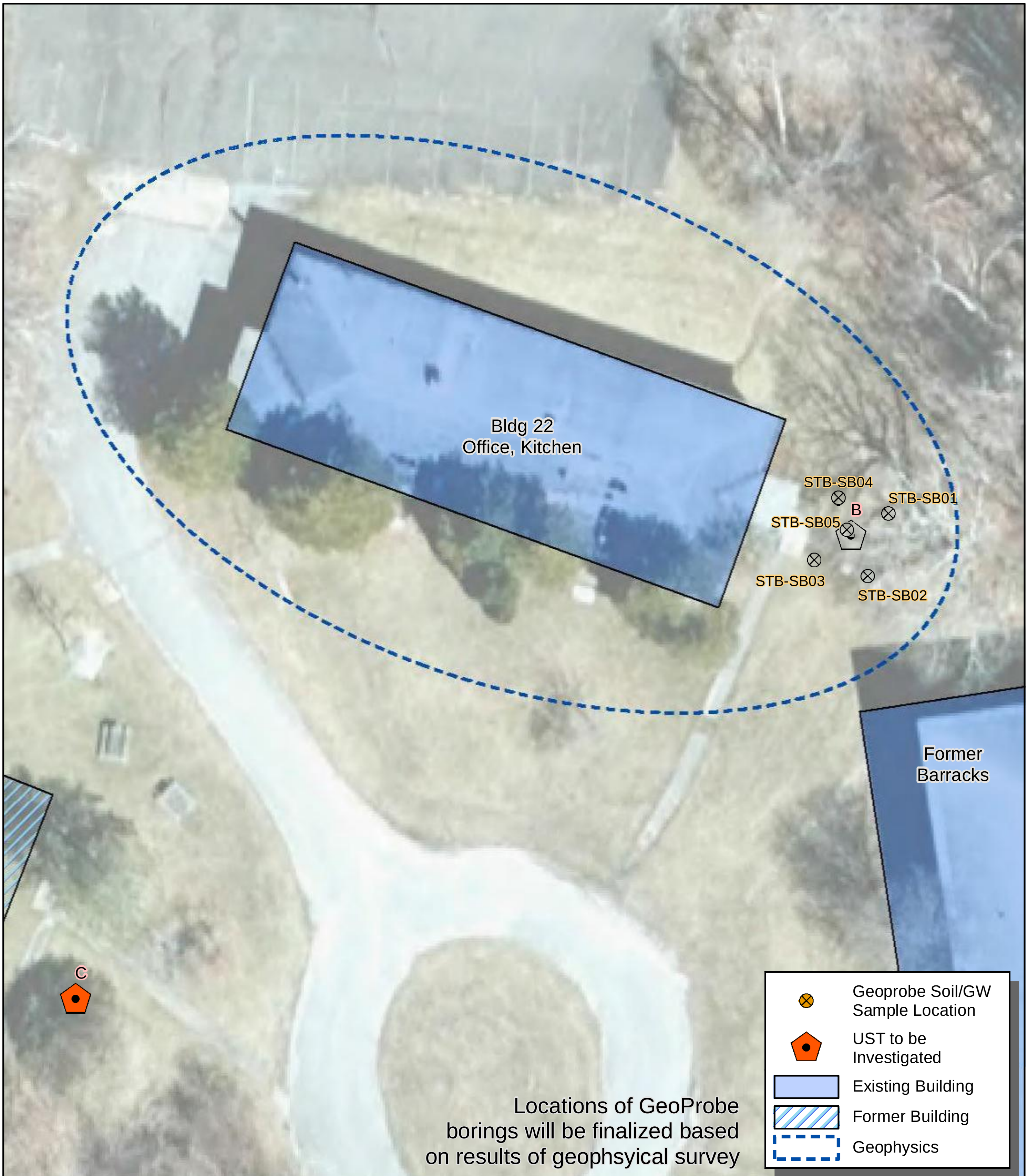
Arlington, VA 22201
T 703-682-4900 F 703-682-4901

Building 20 (Tank-A)
Phase 1 RI Sampling Locations

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-7**

5/2/2016 1:300 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-7 Bldg 20 - Tank A.mxd (USCHL1FP002\Data\Library\Gisprojects\)



MAP LOCATION

N W E S

0 12.5 25 Feet

1 inch = 25 feet

NAD 1983 StatePlane Long Island FIPS 3104

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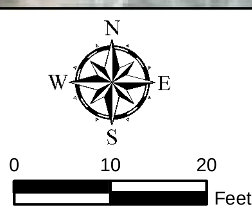
Building 22 (Tank B)
Phase 1 RI Sampling Locations

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-8**

5/2/2016 1:300 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-8 Bldg 22 - Tank B.mxd (USCHL1FP002\Data\Library\Gisprojects\)

MAP LOCATION



1 inch = 20 feet

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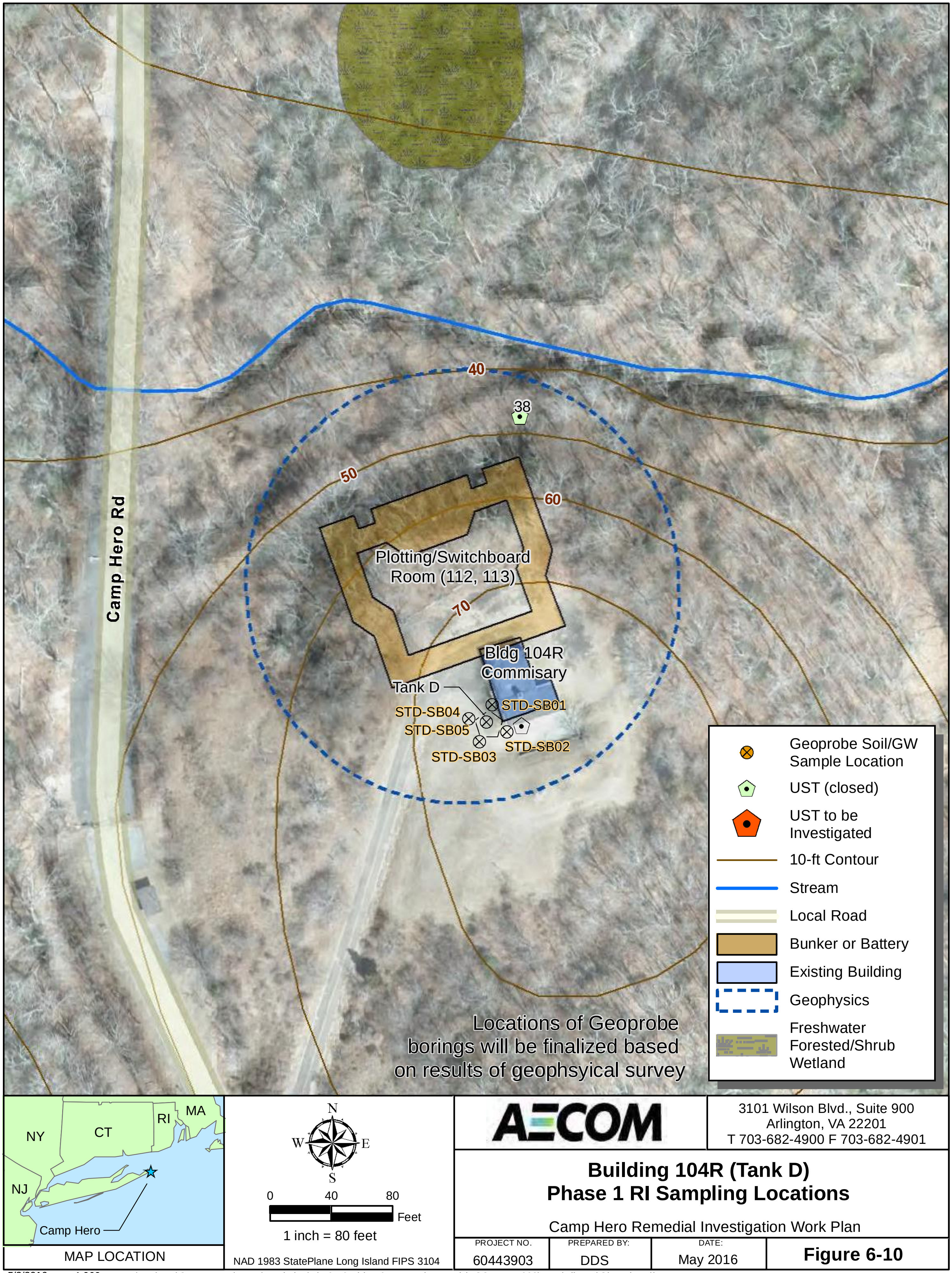
Building 2 (Tank C)
Phase 1 RI Sampling Locations

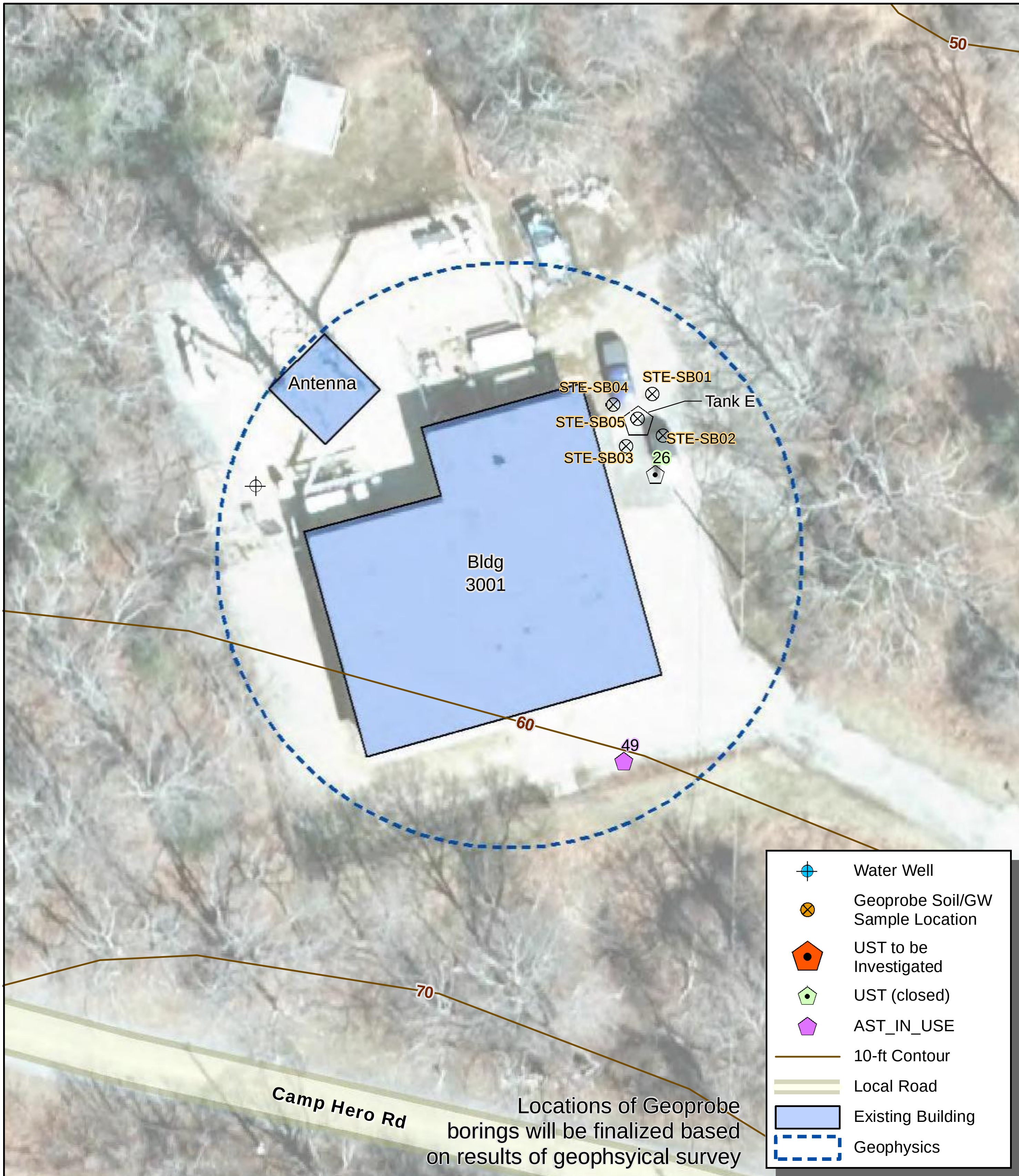
Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-9**

5/2/2016 1:240 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-9 Bldg 2 - Tank C.mxd (USCHL1FP002\Data\Library\Gisprojects\)



Camp Hero Rd
40
38
50
60
70
Plotting/Switchboard Room (112, 113)
Bldg 104R Commisary
Tank D
STD-SB01
STD-SB04
STD-SB05
STD-SB03
STD-SB02
Locations of Geoprobe borings will be finalized based on results of geophsyical survey
Geoprobe Soil/GW Sample Location
UST (closed)
UST to be Investigated
10-ft Contour
Stream
Local Road
Bunker or Battery
Existing Building
Geophysics
Freshwater Forested/Shrub Wetland
NY
CT
RI
MA
NJ
Camp Hero
MAP LOCATION
N
W
E
S
0
40
80
Feet
1 inch = 80 feet
NAD 1983 StatePlane Long Island FIPS 3104
AECOM
3101 Wilson Blvd., Suite 900
Arlington, VA 22201
T 703-682-4900 F 703-682-4901
Building 104R (Tank D)
Phase 1 RI Sampling Locations
Camp Hero Remedial Investigation Work Plan
PROJECT NO.
60443903
PREPARED BY:
DDS
DATE:
May 2016
Figure 6-10
5/2/2016
1:960
Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-10 Bldg 104R - Tank D.mxd (USCHL1FP002\Data\Library\Gisprojects\)



MAP LOCATION

N W E S

0 15 30 Feet

1 inch = 35 feet

NAD 1983 StatePlane Long Island FIPS 3104

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Arlington, VA 22201
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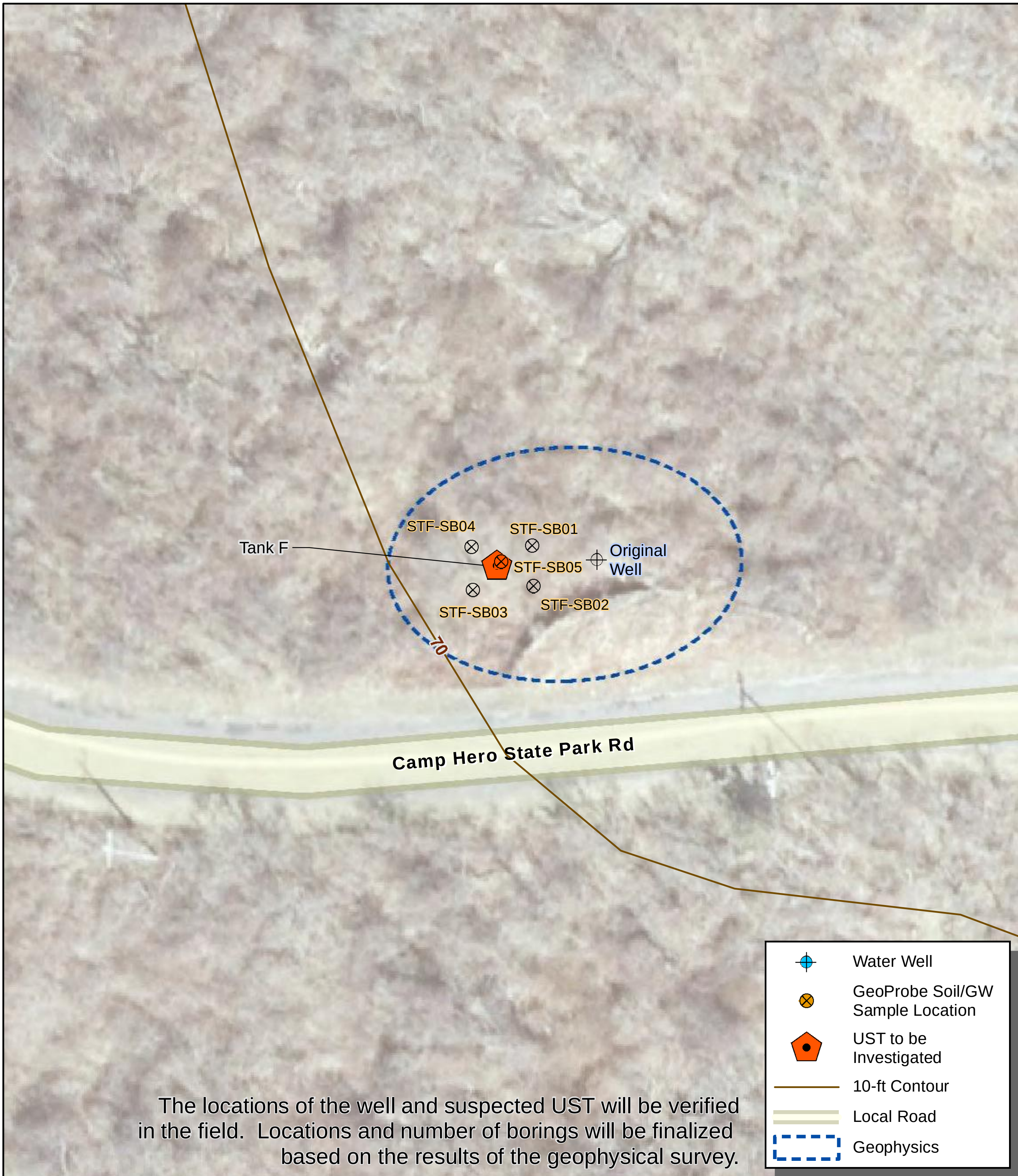
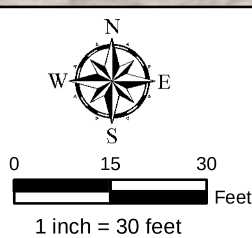
Building 3001 (Tank E)
Phase 1 RI Sampling Locations

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-11**

5/2/2016 1:420 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-11 Bldg 3001 - Tank E.mxd (USCHL1FP002\Data\Library\Gisprojects\)





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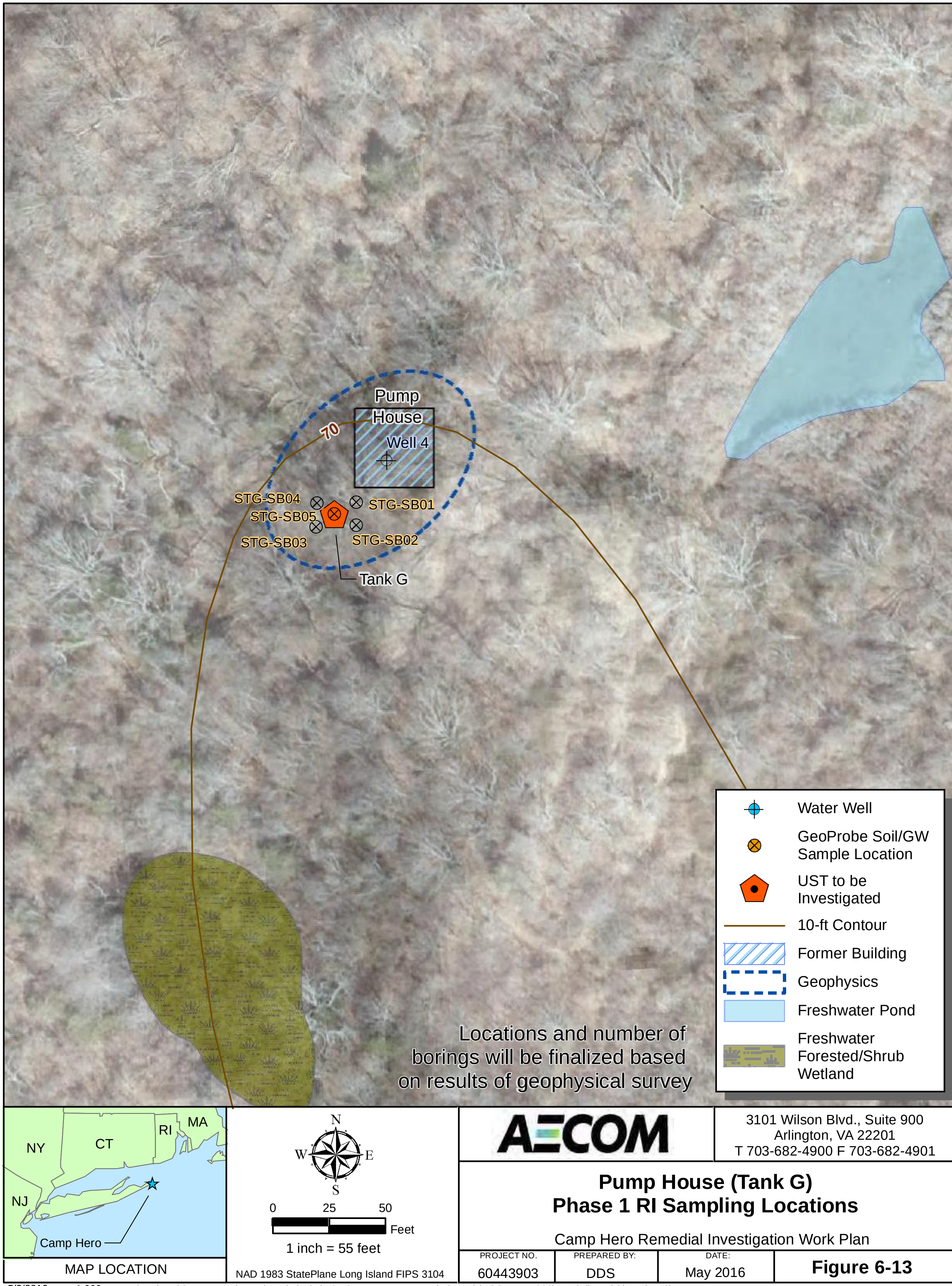
Pump House (Tank F)
Phase 1 RI Sampling Locations

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-12**

5/2/2016 1:360 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-12 PumpHouse - Tank F.mxd (USCHL1FP002\Data\Library\Gisprojects\)



NAD 1983 StatePlane Long Island FIPS 3104

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Pump House (Tank G)
Phase 1 RI Sampling Locations

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-13**

5/2/2016 1:660 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-13 PumpHouse - Tank G.mxd (USCHL1FP002\Data\Library\Gisprojects\)

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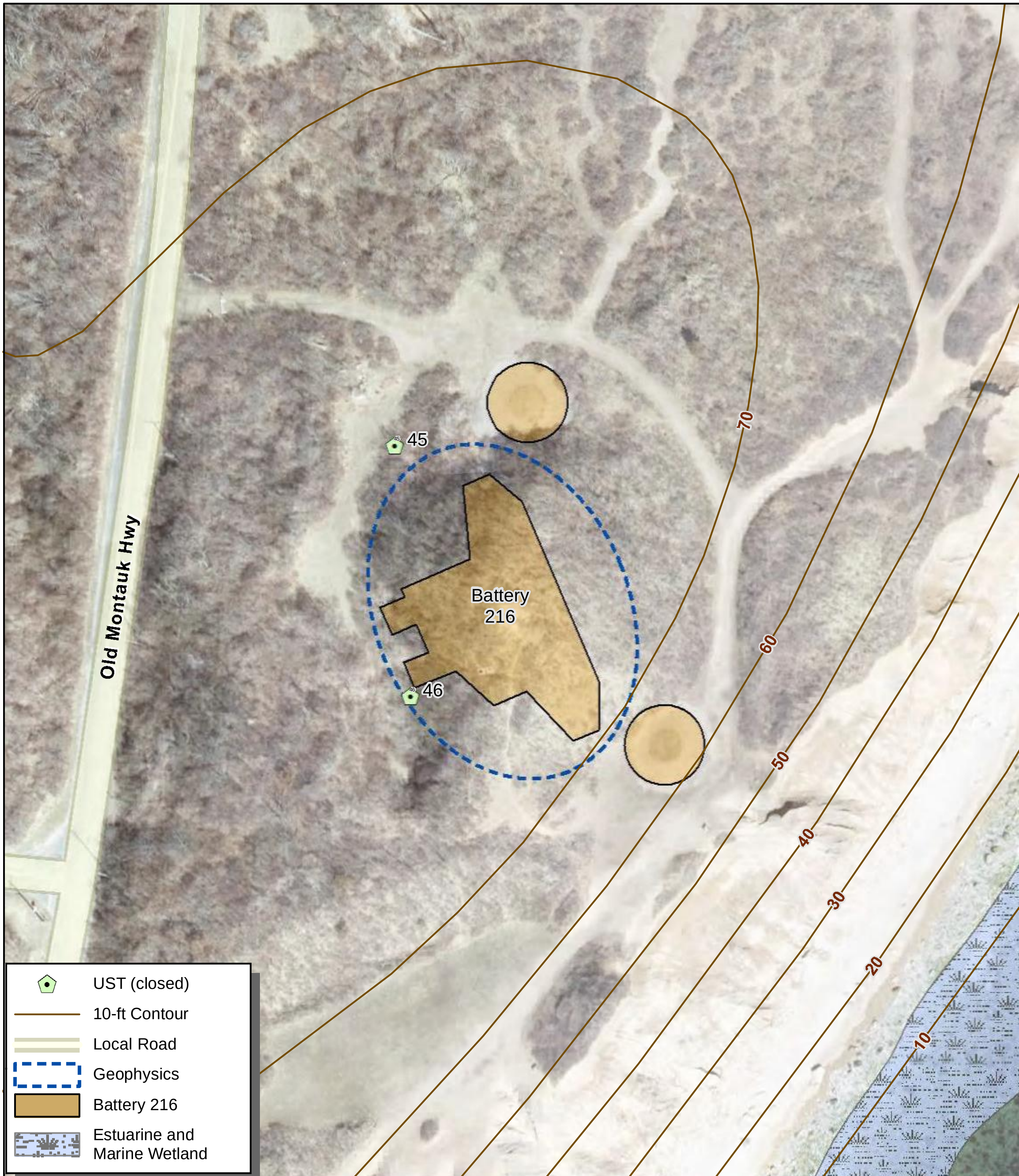
AST-35 (H-13) Phase 1 RI Sampling Locations

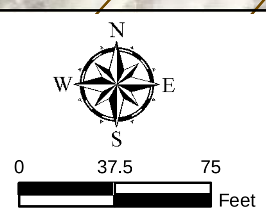
Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	Figure 6-5

5/2/2016 1:360 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-5 AST 35.mxd (USCHL1FP002\Data\Library\Gisprojects\)



MAP LOCATION



1 inch = 75 feet

NAD 1983 StatePlane Long Island FIPS 3104

AECOM

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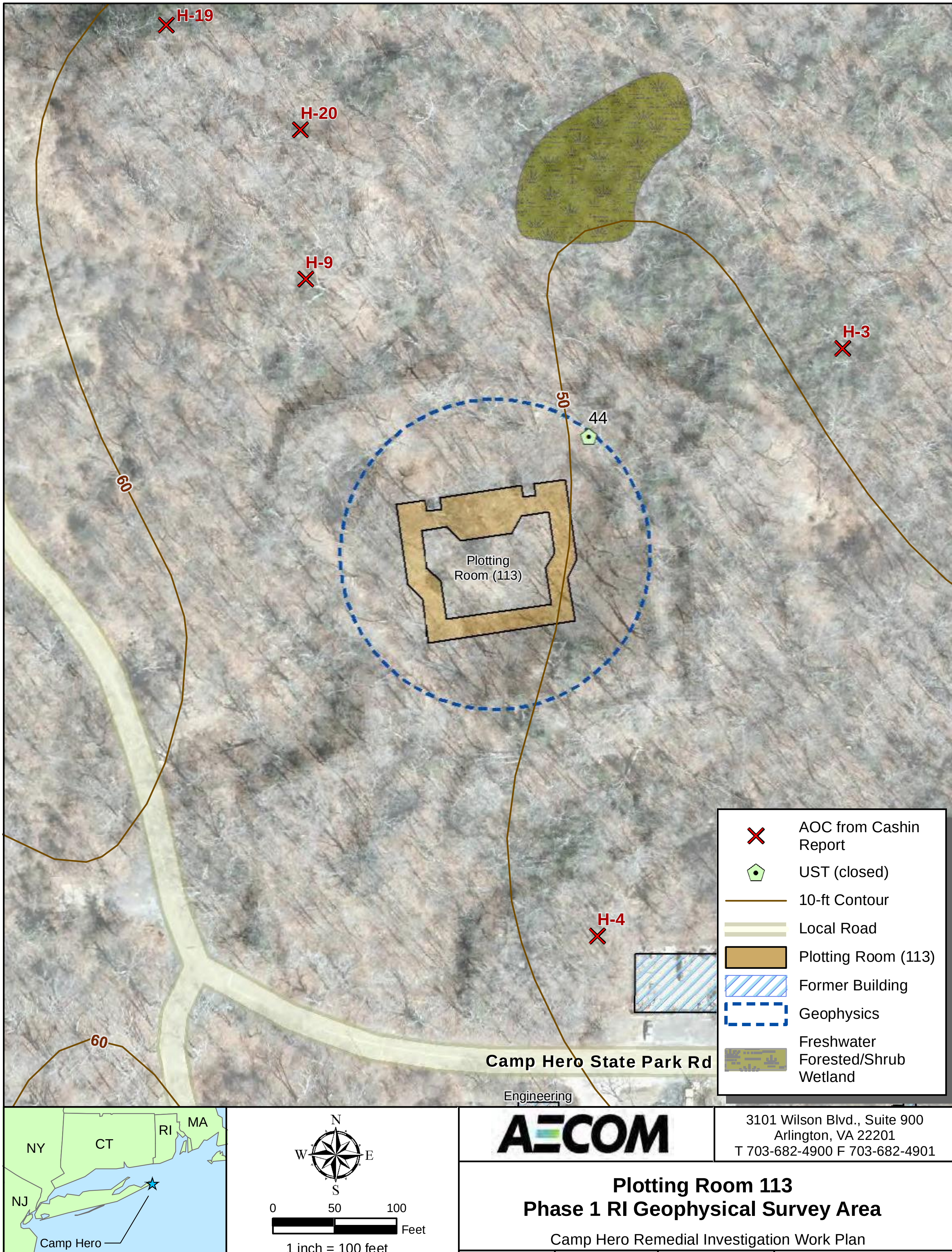
Battery 216
Phase 1 RI Geophysical Survey Area

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-40**

5/2/2016 1:900 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-40 Battery 216.mxd (USCHL1FP002\Data\Library\Gisprojects\)



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Plotting Room 113
Phase 1 RI Geophysical Survey Area

Camp Hero Remedial Investigation Work Plan

PROJECT NO.	PREPARED BY:	DATE:	
60443903	DDS	May 2016	**Figure 6-41**

5/2/2016 1:1,200 Y:\Projects\Camp_Hero\Maps\Workplan\Fig 6-41 Plotting Room 113.mxd (USCHL1FP002\Data\Library\Gisprojects\)

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ATTACHMENT C:

METAL DETECTION SUMMARY FIGURES

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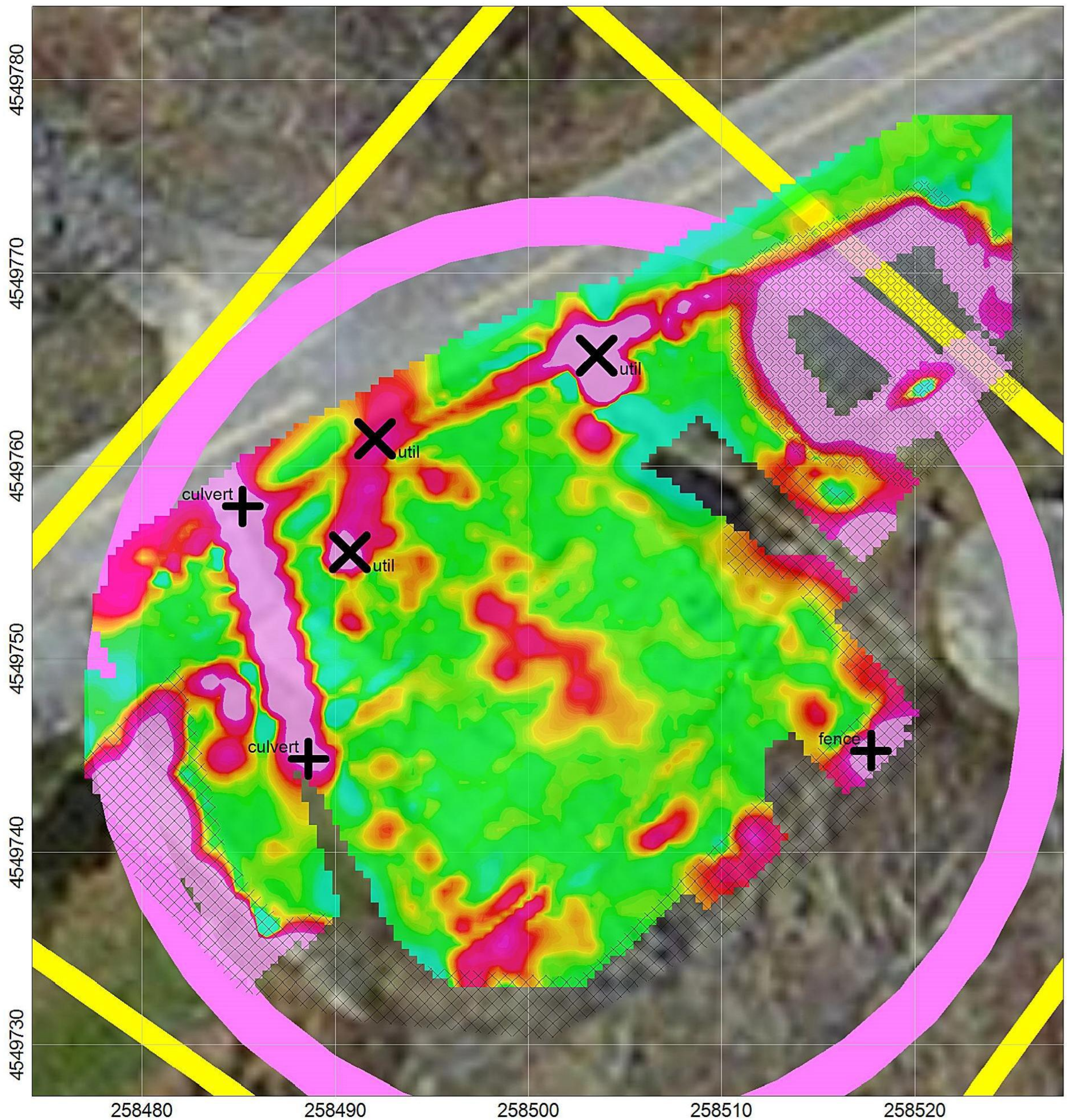
Building 20 - (Tank A) MAP

Buried Metal Detection Map



LEGEND

Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area

340
173
86
67
50
35
24
17
10
1
-8
-16
-34
CH2 (mV)

Scale 1:350
(meters)
Map Scale:

Grid North: 0°0'0"
Mag North: 0°0'0"

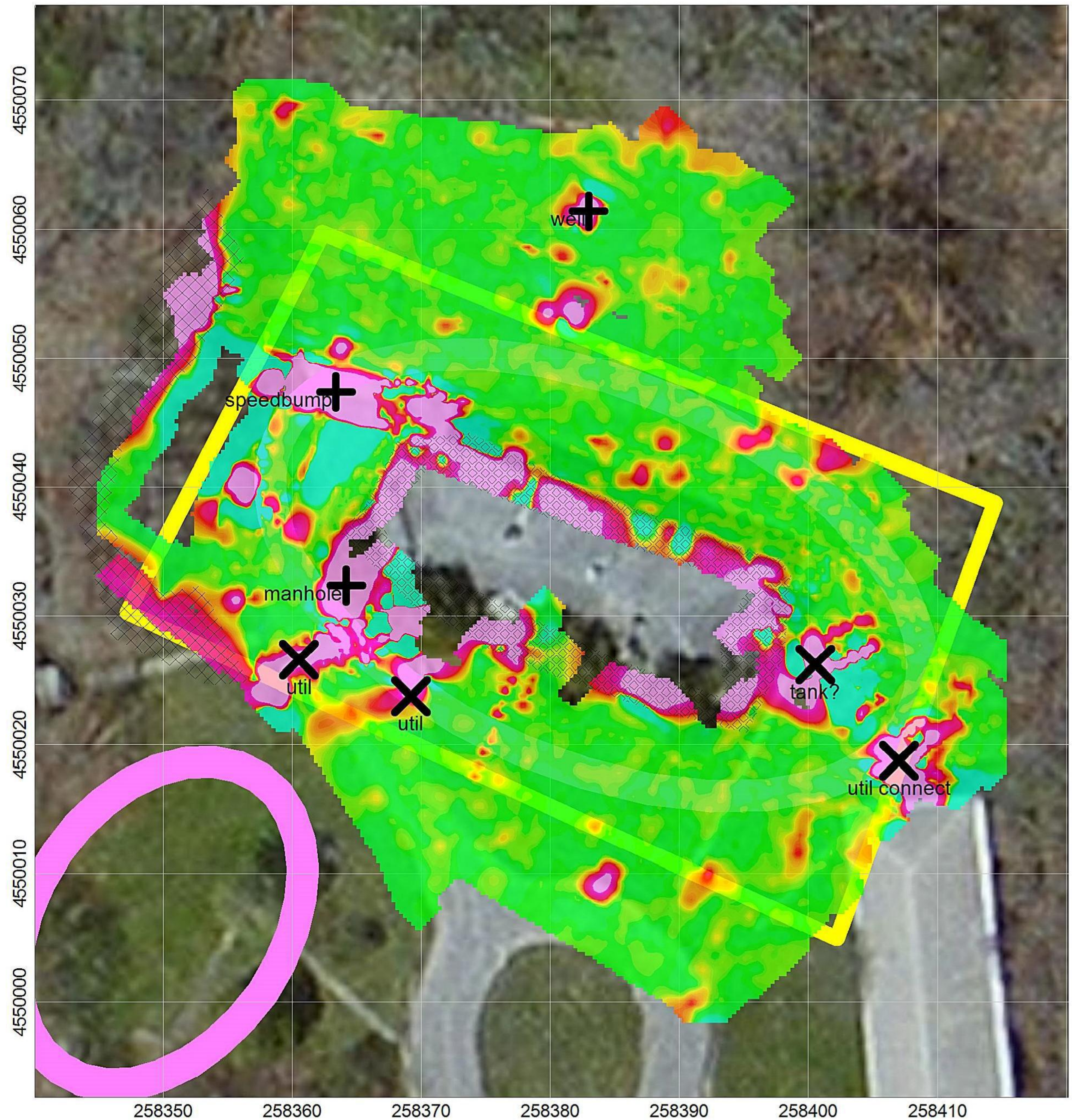
Client: USACE Baltimore

Project: Camp Hero, Montauck, NY

Contractor: AECOM - TIdewater JV

Created by: EC / ME	Verified by: BSB
Date: 05/19/2016	File: Building 20
Page number: 1	Approved: BSB

AECOM



Building 22 - (Tank B) MAP

Buried Metal Detection Map

LEGEND

Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area

CH2 (mV)
340
173
86
67
50
35
24
17
10
1
-8
-16
-34

Scale 1:500

(meters)

WGS 84 / UTM zone 19N

Map Scale:

Grid North: 0°0'0"
Mag North: 0°0'0"

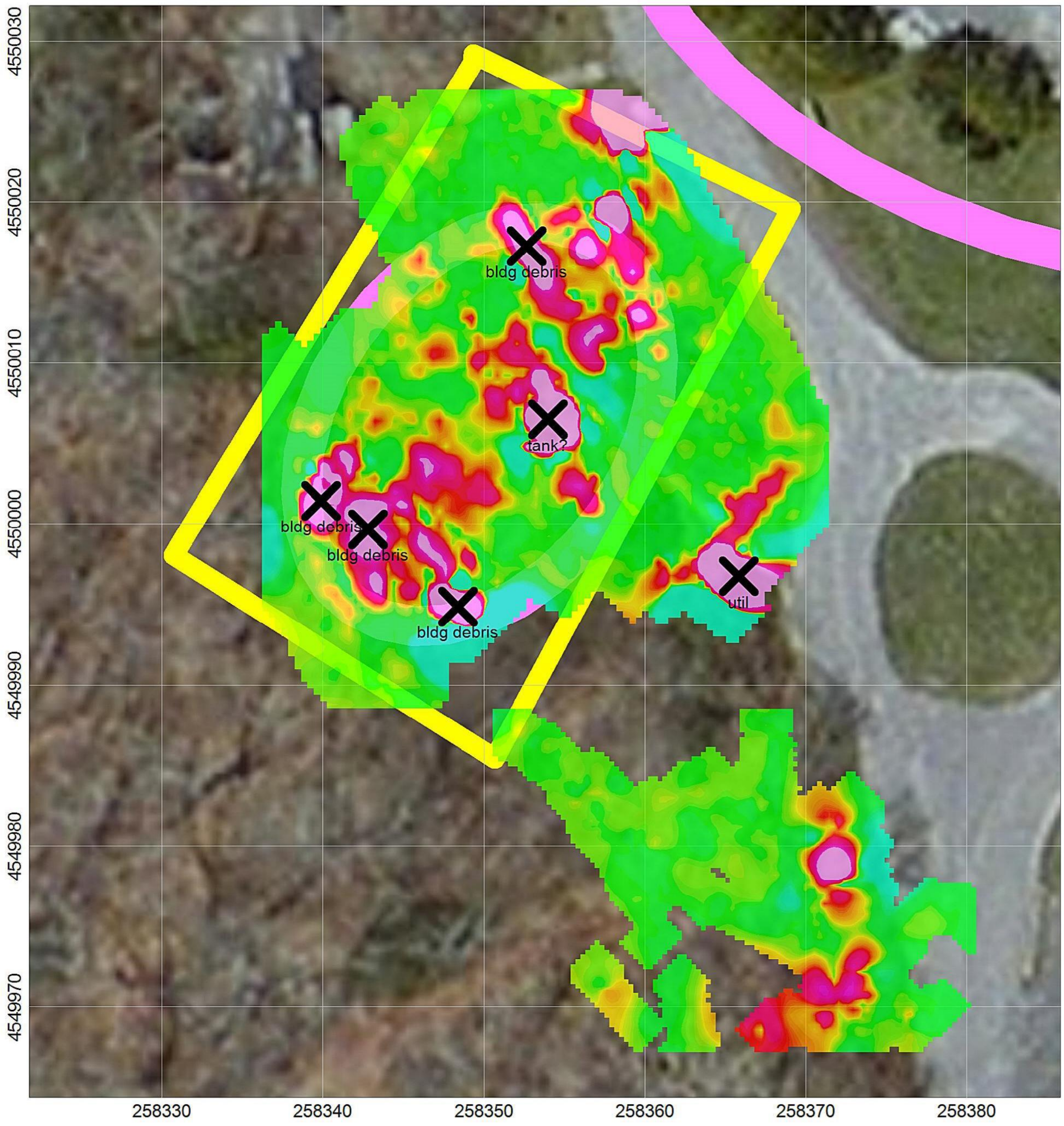
Client: USACE Baltimore District

Project: Camp Hero, Montauck, NY

Contractor: AECOM - Tidewater JV

Created by: EC / ME	Verified by: BSB
Date: 05/17/2016	File: Building 22
Page number: 1	Approved: BSB

AECOM



Building 2 - (Tank C) MAP

Buried Metal Detection Map

LEGEND

Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area

340
173
86
67
50
35
24
17
10
1
-8
-16
-34

CH2 (mV)

Scale 1:400

Map Scale:

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: USACE Baltimore

Project: Camp Hero, Montauck, NY

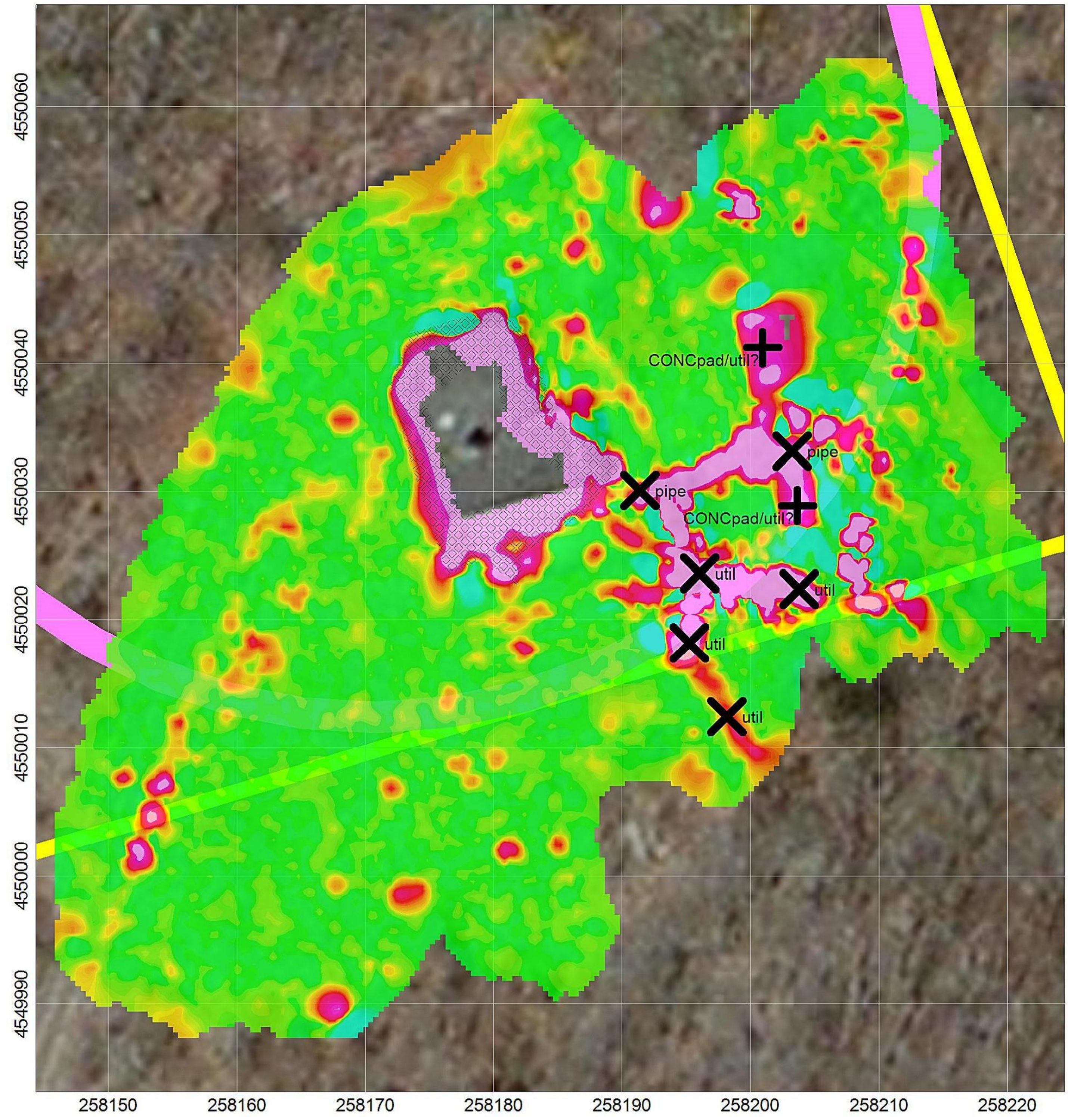
Contractor: AECOM - Tidewater JV

Created by: EC / ME	Verified by: BSB
Date: 05/18/2016	File: Building 2
Page number:	Approved: BSB

AECOM

Building 104R - (Tank D) MAP

Buried Metal Detection Map



LEGEND

Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area

CH2 (mV): 340, 173, 86, 67, 50, 35, 24, 17, 10, 1, -8, -16, -34

Scale 1:500

(meters)

WGS 84 / UTM zone 19N

Map Scale:

Grid North: 0°0'0"

Mag North: 0°0'0"

Client: USACE Baltimore District

Project: Camp Hero, Montauck, NY

Contractor: AECOM - Tidewater JV

Created by: EC / ME	Verified by: BSB
Date: 07/18/2016	File: Building 104R
Page number: 1	Approved: BSB

AECOM

Building 3001 - (tank E) MAP

Buried Metal Detection Map

LEGEND

Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area

CH2 (mV): 340, 173, 86, 67, 50, 35, 24, 17, 10, 1, -8, -16, -34

Scale 1:350

Map Scale:

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: USACE Baltimore District

Project: Camp Hero, Montauck, NY

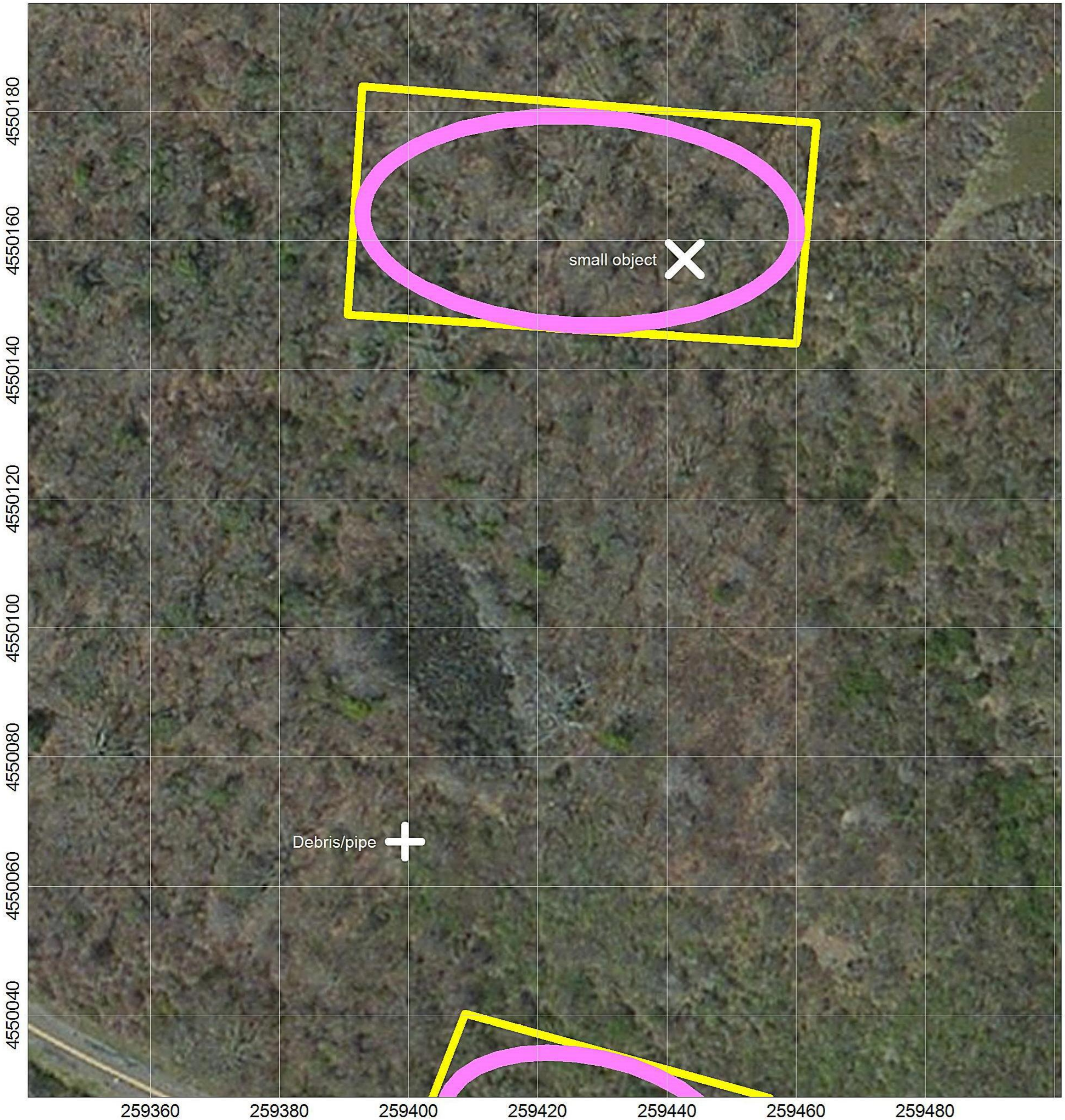
Contractor: AECOM - Tidewater JV

Created by: EC, ME	Verified by: BSB
Date: 05/17/2016	File: Building 3001
Page number: 1	Approved: BSB

AECOM

Pump House - (Tank F and Tank G) MAP

Buried Metal Detection Map



LEGEND

Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area

340
173
86
67
50
35
24
17
10
1
-8
-16
-34

CH2 (mV)

Scale 1:1000

10 0 10

(meters)

WGS 84 / UTM zone 19N

Map Scale:

N

Grid North: 0°0'0"

Mag North: 0°0'0"

Client: USACE Baltimore	
Project: Camp Hero, Montauk, NY	
Contractor: AECOM - Tidewater JV	
Created by: EC / ME	Verified by: BSB
Date: 05/20/2016	File: Building FPH
Page number: 1	Approved: BSB

AECOM

Building FPH - (Tank 35) MAP

Buried Metal Detection Map

LEGEND

- Effects from Building (brick cross-hatch)
- Effects from Fence / Deb (diamond cross-hatch)
- + label: above ground feature (sign w/ label)
- X label: below ground feature (sign w/ label)
- search radius and squared off work area

CH2 (mV): 340, 173, 86, 67, 50, 35, 24, 17, 10, 1, -8, -16, -34

Scale 1:350 (meters) WGS 84 / UTM zone 19N

Map Scale:

Grid North: 0°0'0"
Mag North: 0°0'0"

Client: USACE Baltimore

Project: Camp Hero, Montauck, NY

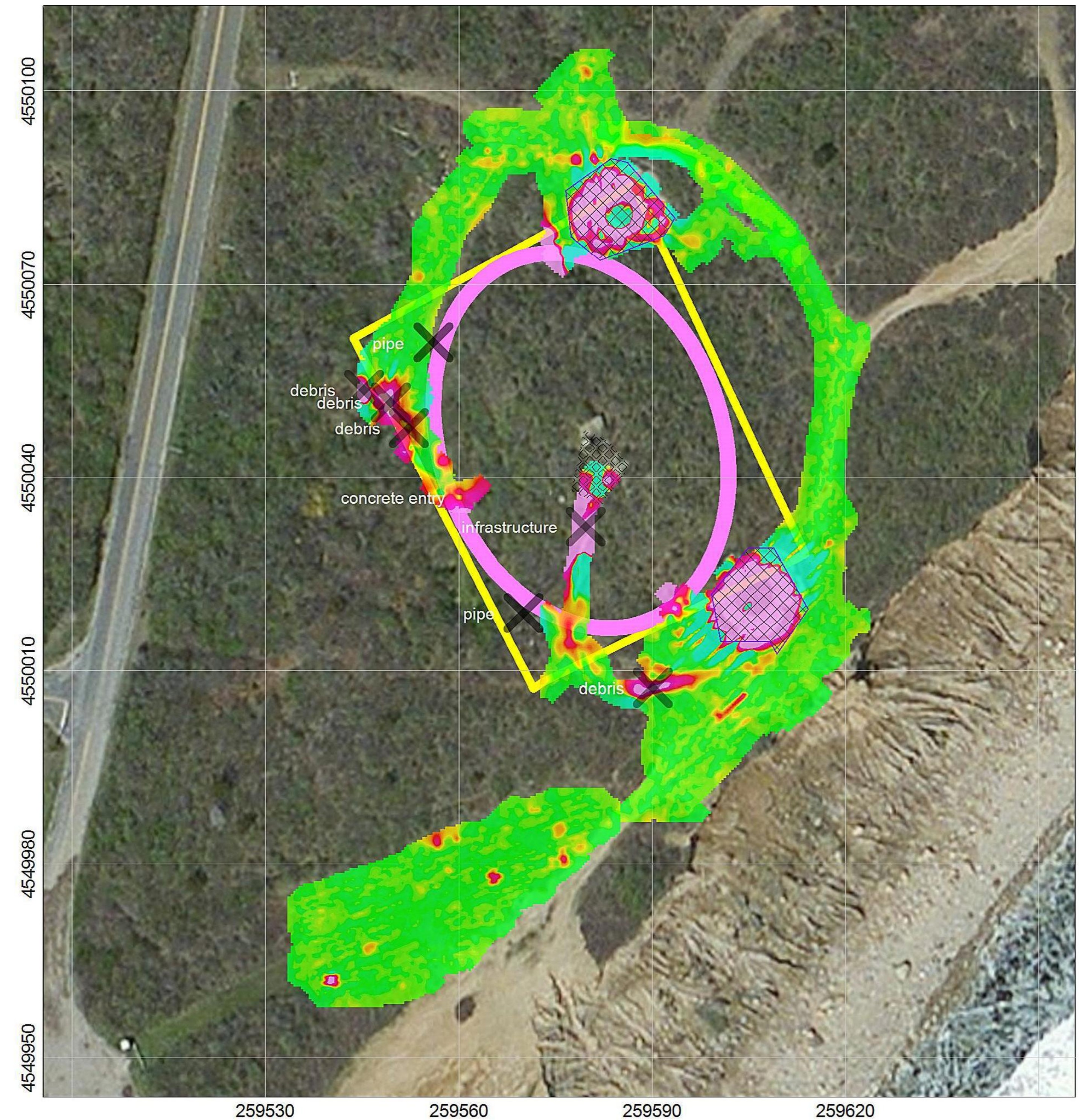
Contractor: AECOM - Tidewater JV

Created by: EC / ME	Verified by: BSB
Date: 05/18/2016	File: Building FPH
Page number: 1	Approved: BSB

AECOM

Battery 216 - (Storage or Vaults) MAP

Buried Metal Detection Map



LEGEND

- Effects from Building (brick cross-hatch)
- Effects from Fence / Deb (diamond cross-hatch)
- + label — above ground feature (sign w/ label)
- X label — below ground feature (sign w/ label)
- search radius and squared off work area

CH2 (mV): 340, 173, 86, 67, 50, 35, 24, 17, 10, 1, -8, -16, -34

Scale 1:1000

10 0 10 (meters)

WGS 84 / UTM zone 19N

Map Scale:

N

Grid North: 0°0'0"

Mag North: 0°0'0"

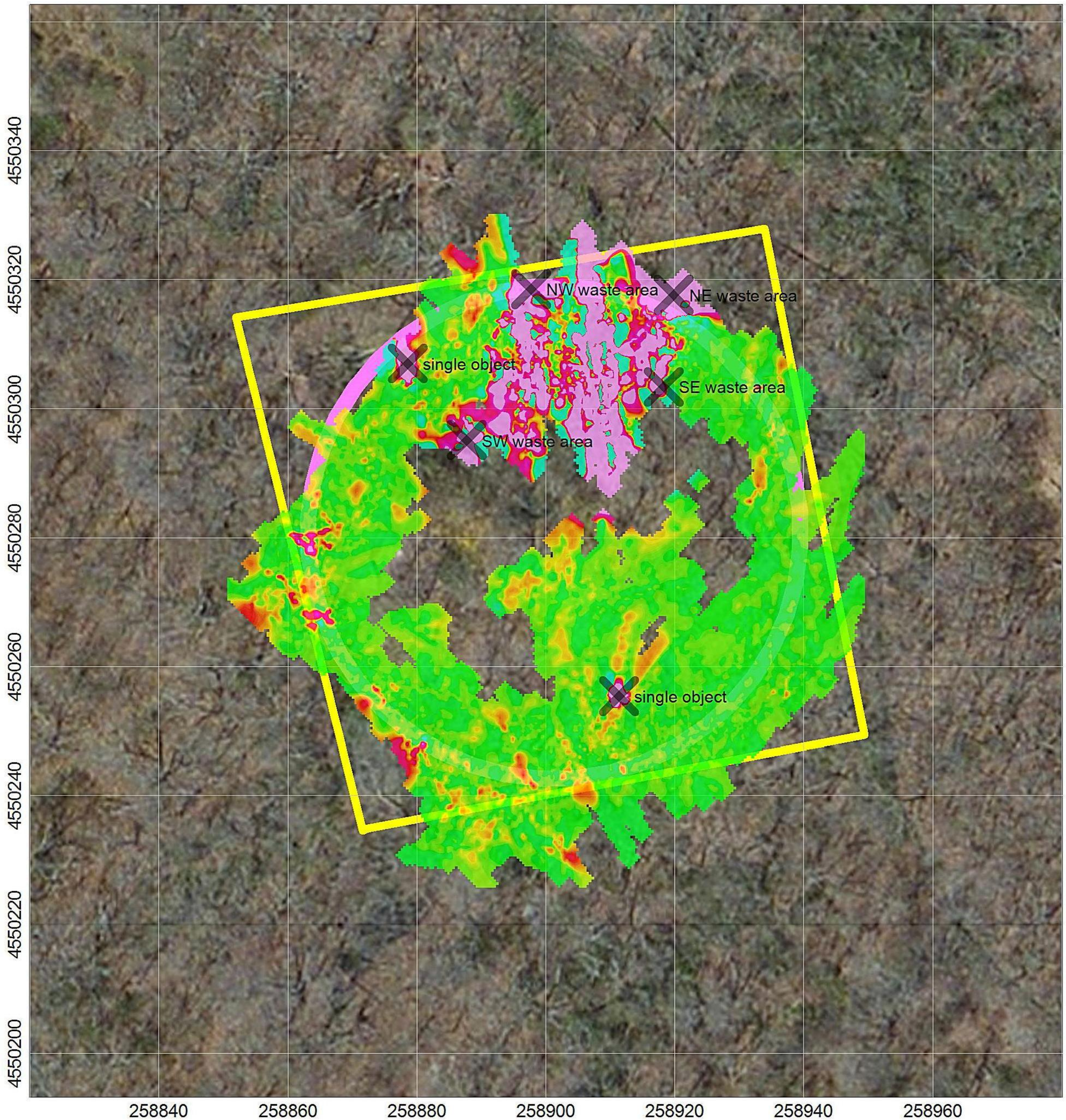
Client: USACE Baltimore

Project: Camp Hero, Montauk, NY

Contractor: AECOM - Tidewater JV

Created by: EC / ME	Verified by: BSB
Date: 05/20/2016	File: Battery 216
Page number: 1	Approved: BSB

AECOM



Plotting Rm 113 - (Drums) MAP

Buried Metal Detection Map

LEGEND

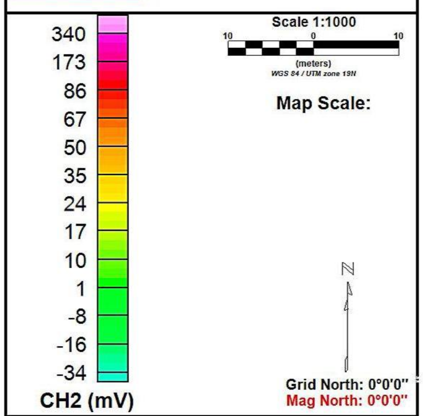
Effects from Building (brick cross-hatch)

Effects from Fence / Deb (diamond cross-hatch)

+ label — above ground feature (sign w/ label)

X label — below ground feature (sign w/ label)

search radius and squared off work area



Client: USACE Baltimore

Project: Camp Hero, Montauck, NY

Contractor: AECOM - Tidewater JV

Created by: EC / ME	Verified by: BSB
Date: 05/20/2016	File: Battery 113
Page number: 1	Approved: BSB

AECOM

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Appendix E

Preliminary Screening Evaluation

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

µg/kg	microgram per kilogram
AOC	area of concern
AST	Aboveground Storage Tank
BaP	benzo(a)pyrene
bgs	below ground surface
BTV	background threshold value
CERCLA	Comprehensive Environmental Restoration, Compensation, and Liability Act
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DoD	Department of Defense, United States
ft	foot or feet
FPH	Fuel Pump House
FS	Feasibility Study
FUDS	Formerly Used Defense Site
JV	Joint-Venture
LANL	Los Alamos National Laboratory
LNAPL	light non aqueous phase liquid
mg/kg	milligram per kilogram
NY	New York
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORNL	Oak Ridge National Laboratory
PAH	Polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
ppm	parts per million
RI	Remedial Investigation

SAP	Sampling and Analysis Plan
SVOC	semi-volatile organic compound
TEQ	toxic equivalence quotient
TOGS	Technical & Operational Guidance Series (NYSDEC)
UFP	Uniform Federal Policy
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WDS	Waste Disposal System

EXECUTIVE SUMMARY

Camp Hero is a formerly used defense site (FUDS) undergoing a Remedial Investigation and Feasibility Study (RI/FS) under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA). A total of 47 areas of concern (AOCs) have been identified during previous investigations, which included Phase I and II RI field investigations. This preliminary screening evaluation was completed for the available RI dataset to (1) determine which AOCs require further assessment as part of the Phase III RI field investigation and (2) refine the list of parameters for sample collection during the Phase III RI field investigation with the intent of completing the RI phase of the CERCLA process.

This document summarizes the existing dataset used in the evaluation, establishes the selection of the preliminary screening values, including site-specific background threshold values (BTVs), and summarizes the results of the evaluation. To complete the preliminary screening evaluation, the maximum detected concentration for each analyte in surface and subsurface soil was compared to the most conservative applicable screening criteria and the site-specific BTVs. If no analytes at an AOC exceeded the screening criteria or BTVs, the AOC was identified for no further action (NFA) under the CERCLA process. If however, any analyte exceeded the screening criteria and also the BTVs, then that AOC was identified as requiring further assessment. In some cases, AOCs were also recommended for further assessment if field observations or measurements indicated evidence of a potential release.

Of the 47 AOCs identified at Camp Hero, NFA is warranted for 25 AOCs, and further assessment is recommended for 21 AOCs as part of the Phase III RI field investigation. The 47th AOC (Waste Disposal System or WSD) is comprised of 14 segments across the Camp Hero site. Of these segments, 8 warrant NFA, and 6 warrant further assessment.

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1.0 INTRODUCTION AND SITE BACKGROUND

Camp Hero is a formerly used defense site (FUDS) undergoing a Remedial Investigation and Feasibility Study (RI/FS) under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA). A total of 47 areas of concern (AOCs) have been identified during previous investigations, which included Phase I and II RI field investigations. This RI/FS program for Camp Hero is being conducted by AECOM in coordination with the United States Army Corps of Engineers (USACE), New England and New York Districts, as well as the Environmental and Munitions (EM) Center of Expertise (CX).

1.1 Preliminary Screening Evaluation Scope and Objectives

The primary objectives of the Camp Hero RI are to determine the nature and extent of potential releases and impacts in site media from former military operations, and to subsequently quantify whether there are unacceptable risks posed to human health or ecological receptors. This preliminary screening evaluation was completed for the available RI dataset to (1) determine which AOCs require further assessment as part of the Phase III RI field investigation and (2) refine the list of parameters for sample collection during the Phase III RI field investigation with the intent of completing the RI phase of the CERCLA process.

1.2 Site Location and History

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, New York, approximately 5 miles east of the Village of Montauk. The park consists of 469 acres and is bound by Montauk Highway (Route 27) to the north, the Atlantic Ocean to the south, Montauk Point State Park to the east, and Camp Hero State Park's undeveloped sanctuary area to the west. The landscape includes wooded areas, freshwater wetlands, and seaside bluffs.

The park was initially established in early 1942 as a Coastal Defense Installation. Military development included a series of underground bunkers, gun batteries, barracks, mess halls, hospital facilities, a motor repair shop, a recreation facility, sentry boxes, water supply and sewage facilities, and a radar tower. The military operations continued after 1952, when the park was renamed the Montauk Air Force Station, and generally ended in 1980 when remaining military personnel were transferred off-base and the park was subsequently conveyed to New York State as "Camp Hero State Park" in 1984. In 2015 and 2016, a total of 47 potential AOCs were identified by the USACE for environmental investigation via the CERCLA process.

1.3 Compilation of the Dataset

A historical records review conducted as part of the Camp Hero RI identified 47 AOCs requiring environmental investigation. The AOCs included former waste disposal areas, former coal storage areas, abandoned drum locations, possible and former USTs, and a Motor Pool building, among others. The existing dataset for the preliminary screening was collected over two sampling events at Camp Hero:

- ***Phase I Investigation (AECOM-Tidewater JV 2016).*** The primary objective of the Phase I investigation was to determine the presence or absence of contamination at the 47 Camp Hero AOCs. Phase I activities included collection of discrete, biased surface and subsurface soil samples for use in the preliminary screening evaluation and grab groundwater samples for use in refining the groundwater conceptual site model (CSM).

- ***Phase II Investigation (AECOM-Tidewater JV 2017).*** Phase II activities at the former Building 203 AOC included surface soil sample collection on discrete, unbiased grids within two sample units (SUs) to support the EPC calculation; discrete biased subsurface soil sampling within two SUs for use in preliminary screening; and groundwater sample collection from six newly-installed permanent monitoring wells to support the groundwater CSM.

Figure 1 provides the layout of Camp Hero, with the locations of surface and subsurface soil samples collected during the Phase I and II RI field investigations. These sampling locations provided the datasets for this preliminary screening evaluation. Surface soil samples were collected from 0 to 1 foot (ft) below ground surface (bgs) and subsurface soil samples were collected from 1 to 10 ft bgs.

2.0 SELECTION OF PRELIMINARY SCREENING VALUES

For the available Phase I and II RI field investigation datasets, the maximum detected concentration for each analyte in surface and subsurface soil was compared to the most conservative applicable screening criteria and the site-specific background threshold values (BTVs). If no analytes at an AOC exceeded the screening criteria or BTVs, the AOC was identified for no further action (NFA) under the CERCLA process. If however, any analyte exceeded the screening criteria and also the BTVs, then that AOC was identified as requiring further assessment. In some cases, AOCs were also recommended for further assessment if field observations or measurements indicated evidence of a potential release.

2.1 Selection of Human Health Screening Criteria for Soil

Preliminary human health screening values for surface and subsurface soil for all AOCs were based on the most conservative (lowest values) from the following sets of human health criteria:

- USEPA Regional Screening Levels for Residential Soil with a Target Hazard Quotient (THQ) of 0.1 (USEPA 2016), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017).
- 6 NYCRR Part 375-1 Remedial Program Residential Soil Cleanup Objectives (SCOs), Table 6.8(b) (NYCRR 2015).

Additionally, preliminary screening for AOCs with potential petroleum impacts also included the following additional sets of New York State criteria:

- NYSDEC CP-51 Soil Cleanup Guidance Supplemental Residential SCOs, Table 1 (NYSDEC 2010a).
- NYSDEC CP-51 Soil Cleanup Guidance Soil Cleanup Levels (SCLs) for Gasoline and Fuel Oil, Tables 2 and 3 (NYSDEC 2010a).

2.2 Selection of Ecological Screening Criteria for Soil

Preliminary ecological screening values for surface soil for all AOCs were selected using a hierarchic approach using the following sets of ecological criteria. These values consider potential risks to invertebrates and plants, as well as birds and mammals (wildlife) as ecological receptors. The priority for these sets of criteria is based on industry standards associated with the toxicity data, supporting documentation, and frequency of updates. Note that subsurface soil was not compared to ecological criteria because subsurface soil is not considered commonly accessible for the representative receptors being evaluated.

For lower trophic level receptors (soil invertebrates and terrestrial plants):

1. USEPA Ecological Soil Screening Levels (Eco-SSLs) for plants and soil invertebrates derived according to Guidance for Developing Ecological Soil Screening Levels (USEPA 2005), including interim documents developed from 2006 through 2008.

2. Oak Ridge National Laboratory (ORNL) Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants (Efroymson et al. 1997a).

3. ORNL Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and litter Invertebrates and Heterotrophic Process (Efroymson et al. 1997b).

4. USEPA Region 4 Supplemental Guidance to Ecological Risk Assessment (USEPA 2015).

5. Los Alamos National Laboratory (LANL) Ecorisk Database, Release 3.3 (LANL 2015).

For higher trophic level receptors (birds and mammals):

1. The lower of the USEPA Eco-SSLs for birds and mammals derived according to USEPA guidance (USEPA 2005).

2. The lowest of the wildlife-based soil Preliminary Remediation Goals (PRGs) presented in ORNL's Preliminary Remediation Goals for Ecological Endpoints (Efroymson et al. 1997c).

3. The lower of the soil screening values for birds and mammals presented in USEPA Region 4 Supplemental Guidance to Ecological Risk Assessment (USEPA 2015).

4. The lowest of the wildlife-based soil screening values for birds and mammals presented in the LANL Ecorisk Database (LANL 2015).

Additionally, preliminary screening for AOCs with potential petroleum impacts also included the following additional sets of New York State criteria:

- NYSDEC CP-51 Soil Cleanup Guidance Supplemental Residential SCOs, Table 1 (NYSDEC 2010a).

- NYSDEC CP-51 Soil Cleanup Guidance Soil Cleanup Levels (SCLs) for Gasoline and Fuel Oil, Tables 2 and 3 (NYSDEC 2010a).

2.3 Development of Site-Specific Background Threshold Values

A site-specific background study was completed at Camp Hero to calculate BTVs for surface soil and subsurface soil, which are applied as part of this preliminary screening evaluation. BTVs were also calculated for metals in groundwater. The soil BTVs were calculated for PAHs and TAL metals based on the generally ubiquitous nature of those parameter groups and the relatively frequent finding that they are not exclusively related to CERCLA releases. The derivation and results of BTVs are provided separately. BTVs will also be calculated for surface water and sediment after completion of the Phase III RI field investigation, which will include the collection of background/reference surface water and sediment samples.

The primary objective of the surface and subsurface soil background study was to provide BTVs for comparison to site-specific sampling results collected during prior field investigations. Permutation testing was conducted to 1) compare the mean of two soil type data sets, Whitman Sandy Loam (WSL) and Montauk Loam (ML) and 2) compare the mean of surface and subsurface soil data sets.

If the mean concentrations for the ML and WSL soil types were determined to be similar, then the ML and WSL data sets were combined for that particular metal at the specified depth (surface or subsurface), resulting in one BTV. However, if the mean concentrations were significantly different, then the soil types were analyzed separately for that particular metal, resulting in two BTVs. Similarly, if mean concentrations between surface and subsurface data for a chemical were determined to be similar, a BTV was calculated based on the combined depth data set.

For four metals (arsenic, calcium, iron, and manganese), the soil types were statistically different for at least one depth horizon. In these cases, the lower of the soil type BTVs was conservatively selected for comparison to the existing soil dataset for identifying analytes and AOCs warranting further assessment. For several metals (aluminum, arsenic, beryllium, calcium, chromium, copper, iron, nickel, selenium, silver, vanadium, and zinc), the permutation testing results identified no significant differences between surface and subsurface different soil depths. In these cases, a combined soil depth BTV was derived and used for screening both surface and subsurface data.

In cases, where the permutation testing identified significant differences with the sampling depths, separate surface and subsurface soil BTVs were derived. If more than one BTV was available per each soil depth, the lowest surface soil BTV was selected to evaluate the surface data and the lowest subsurface BTV was used to evaluate the sub-surface data. The BTVs for surface, subsurface soil, and groundwater, and forthcoming BTVs for surface water and sediment will collectively be used in the human health and ecological risk assessments and may be used to assist the team in making risk-based decisions after the risk assessments are completed.

U.S. Environmental Protection Agency (USEPA) ProUCL 5.1 statistical software and PAleontological STatistics (PAST) 3.13 data analysis software were used to conduct the statistical analysis of the background soil data. The analysis included summary statistics, goodness-of-fit testing, permutation testing, outlier testing, and finally BTV calculations. Refer to the background study report for further details.

2.4 Calculation of the Selected Screening Values

To select screening values for this preliminary screening evaluation, the criteria sources identified for human health and ecological receptors (refer to Section 2.1 and 2.2) were compared to select the most conservative (lowest) value for each parameter. Tables 2 and 3 present the comparison for surface soil, and Tables 4 and 5 present the comparison for subsurface soil.

3.0 ADDITIONAL CONSIDERATIONS

In addition to the analytical screening process described in Section 2.0, additional considerations in evaluating AOCs for further assessment included the results of geophysical or magnetometer surveys (provided separately), an evaluation of AOCs under the context of CERCLA, an evaluation of the types of analytes in exceedance at each of the AOCs, and field observations.

3.1 Geophysical and Magnetometer Surveys

Geophysical or magnetometer surveys were completed at 15 AOCs during the Phase I investigations. At 10 AOCs, results indicated that no underground anomalies were present and no samples were warranted. At 2 AOCs, geophysical surveys indicated tank-sized subsurface anomalies, but small "test holes" verified that no tanks were present at these locations and no evidence of a release was observed (petroleum odor or staining). At 1 AOC, geophysical surveys indicated tank-sized subsurface anomalies and evidence of petroleum was observed in a small "test hole" (petroleum odor and elevated PID readings). Soil and grab-groundwater samples were collected at this AOC. Additionally, extensive visual and magnetometer surveys were conducted at 2 AOCs to locate boilers noted by Cashin (1998) at areas H-7 and H-8, but the boilers could not be located. Refer to Section 4.1 for further details.

3.2 CERCLA Context

A total of 2 AOCs and 1 additional area observed during the Phase I field investigation were identified as exhibiting potential impacts that would not be categorized as a CERCLA release, and thus, are being addressed outside the context of CERCLA. Refer to Section 4.1 for further details.

3.3 Types of Analytes

Through this preliminary screening evaluation, there was 1 AOC with no exceedances other than calcium. Calcium is not considered in either the human health or ecological risk assessments, and is considered an essential nutrient. Thus, NFA is warranted for this AOC. Refer to Section 4.1 for further details.

3.4 Field Observations

Field observations during prior investigations were also considered in evaluating AOCs for further assessment. At 4 AOCs, surface and subsurface soil samples collected in vicinity of identified buried debris exhibited no analytes exceeding screening values or BTVs; however, field observations indicated potential groundwater impacts. During temporary well-point grab sampling of groundwater, the field team reported evidence of a petroleum sheen or odor. Based on this observation, further assessment is warranted at these AOCs. Refer to Section 4.2 for further details.

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4.0 RESULTS OF THE PRELIMINARY SCREENING EVALUATION

The maximum detected concentration for each analyte in surface and subsurface soil was compared to the most conservative applicable screening criteria and the site-specific BTVs. If no analytes at an AOC exceeded the screening criteria or BTVs, the AOC was identified for NFA under the CERCLA process. If however, any analyte exceeded the screening criteria and also the BTVs, then that AOC was identified as requiring further assessment. In some cases, AOCs were also recommended for further assessment if field observations or measurements indicated evidence of a potential release.

Tables 6 through 9 present the results of the preliminary screening evaluation, and Figure 2 provides the sitewide view of the results. On Figure 2, sampling locations are shown in red if they exhibited at least one analyte in exceedance of this evaluation. The remaining sampling locations (without any analytes in exceedance) are shown in black. Table 10 presents a summary of the results for the Camp Hero AOCs, including which AOCs warrant NFA and which will proceed to the Phase III investigation for further assessment.

4.1 AOCs Warranting No Further Assessment

A total of 25 AOCs, plus 8 of 14 segments of the WDS AOC, warrant NFA based on the results of this preliminary screening evaluation, results of the geophysical surveys, or an evaluation of potential CERCLA releases, as summarized in Table 10.

Based on this preliminary screening evaluation of site data, NFA is warranted for Building 201, Building 2010 (UST 30), Building F100C (UST 34), Drum Site (H-22), Engineering Field Office, Open Pits (H-17), Open Pits (H-21), Plotting Room 113, and 8 segments of the WDS (segments -SB04 and -SB05 Septic Tank, -SB10 Box, -SB11 Cesspool, -SB12 Manhole, -SB14 to -SB17 Cesspools, -SB18 to -SB19, and -SB21/-SB22 Septic Tank/Drain Field). No compounds were exceeding preliminary screening values or BTVs in surface or subsurface soil at these AOCs.

Based on the presence of only calcium in excess of screening criteria, NFA is warranted for one component of the WDS (segment -SB20). As previously indicated, calcium is not considered in either the human health or ecological risk assessments and is considered an essential nutrient.

Based on the results of the geophysical surveys, NFA is warranted at AOCs Battery 216, AGC Sites 1 – 4 (including the Camp Hero State Park Bluffs), Building 20 (Suspected Tank A), Building 104R (Suspected Tank D), Building 3001 (Suspected Tank E), Pump House (Suspected Tank F), and Pump House (Suspected Tank G). No underground anomalies were identified during geophysical and magnetometer surveys and no sampling was conducted.

Based on “test holes” conducted during the Phase I investigation, NFA is warranted at AOCs Building 2 (Suspected Tank C) Building 109 (Suspected Tank H). Geophysical surveys at these AOCs indicated tank-sized subsurface anomalies, but small "test holes" verified that no tanks were present at these locations and no evidence of a release was observed (petroleum odor or staining).

Based on results of a magnetometer survey, AOCs H-7 and H-8 Boilers warrant NFA. An extensive visual and magnetometer survey was conducted to locate the boilers noted by Cashin (1998) at areas H-7 and H-8, but the boilers could not be located. Additionally, based on building access restrictions, the AOC Battery 112 also warrants NFA. Entrances to AOC Battery 112 were sealed for safety purposes; building access is not available.

Based on an evaluation of potential CERCLA releases, NFA "under CERCLA" is required for Battery 113, Building 107, and Building 10. PCBs were detected in either wipe or concrete chip samples at Battery 113 and Building 107, and an AST containing weathered fuel was identified in Battery 113. Additionally, paint and jet hydraulic oil cans were identified in Building 10 during the Phase I investigation, which were likely left by military activities at the site. Building 10 was not included as an AOC in the RI WP, but the existing materials were inventoried during the Phase I field effort at the request of the USACE. While no further assessment is deemed necessary as part of Phase III efforts for Battery 113, Building 107, and Building 10, a response action will be recommended to address the aforementioned findings in these areas.

4.2 AOCs Warranting Further Assessment

A total of 21 AOCs, plus 6 segments of the WDS AOC, warrant further assessment as part of the Phase III investigation based on the results of this preliminary screening evaluation. These AOCs either had constituents in surface or subsurface soil exceeding preliminary screening values and BTVs, or field evidence of a potential release, including petroleum odor or sheen on groundwater from temporary wells. Specifically, further assessment is warranted at AST35 [AST-35 (H-13)], FPH (FPH for AST-35), and STB (Suspected Tank B) AOCs based on the field observation of petroleum sheen or odor during grab-groundwater sampling from temporary well-points during the Phase I field investigation. These AOCs warrant further assessment to verify whether petroleum impacts are present.

4.3 Preliminary Screening Evaluation Summary

An overall summary of this preliminary screening evaluation is presented in Table 10. In summary, of the 47 AOCs identified at Camp Hero, NFA is warranted for 25 AOCs, and further assessment is recommended for 21 AOCs as part of the Phase III investigation. The 47th AOC, the WDS, is comprised of 14 segments across the Camp Hero site. Of these segments, 8 warrant NFA, and 6 warrant further assessment. The Phase III sampling approach, including specific analytes and media needing further evaluation, will be established in the Camp Hero Phase III SAP.

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Figures

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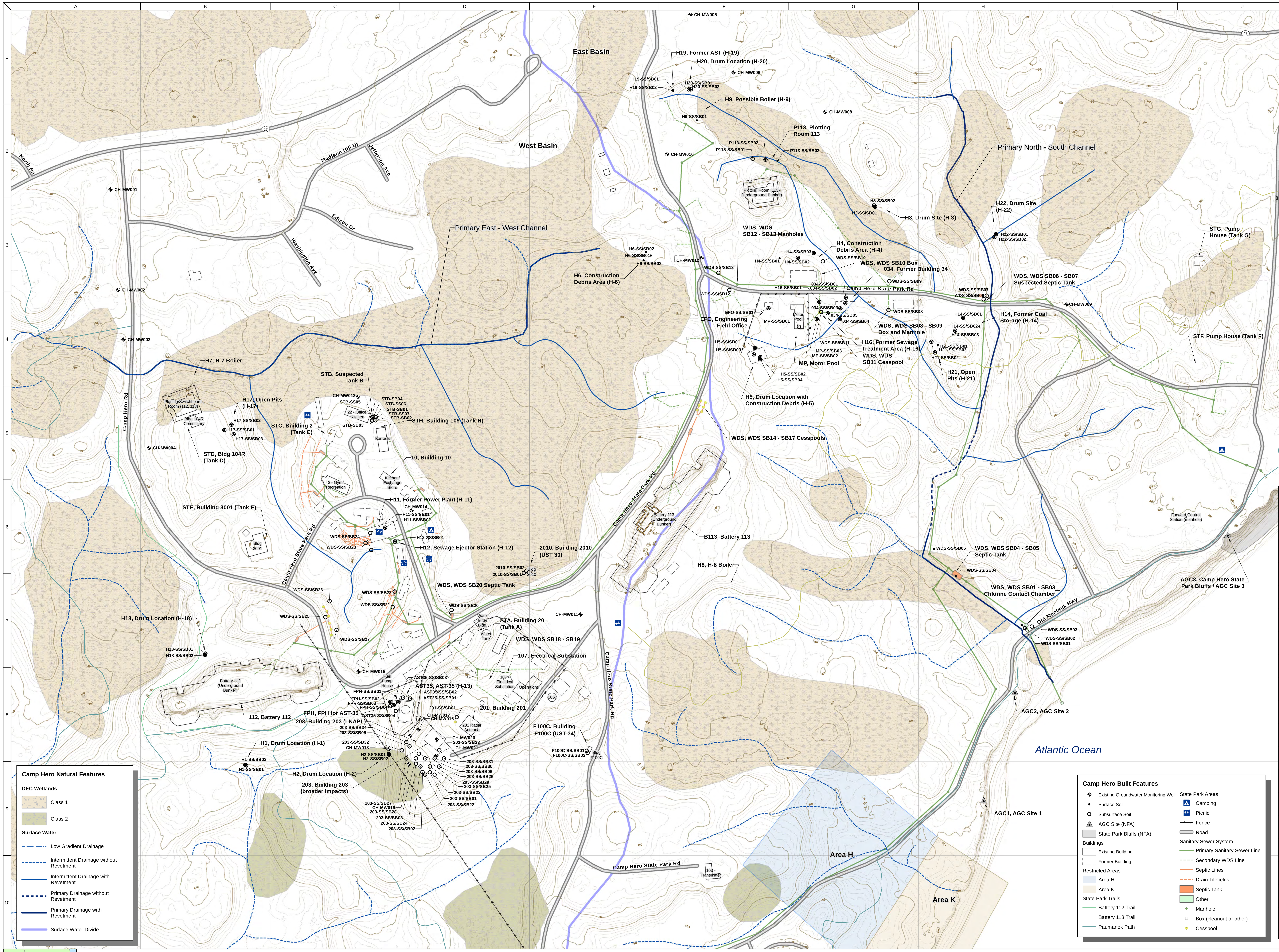

AOC ID	AOC Name
10	Building 10
034	Former Building 34
107	Electrical Substation
112	Battery 112
201	Building 201
203	Building 203 (LNAPL)
203	Building 203 (broader impacts)
216	Battery 216
2010	Building 2010 (UST 30)
AGC1	AGC Site 1
AGC2	AGC Site 2
AGC3	Camp Hero State Park Bluffs / AGC Site 3
AGC4	AGC Site 4
AST35	AST-35 (H-13)
B113	Battery 113
EFO	Engineering Field Office
F100C	Building F100C (UST 34)
FPH	FPH for AST-35
H1	Drum Location (H-1)
H11	Former Power Plant (H-11)
H12	Sewage Ejector Station (H-12)
H14	Former Coal Storage (H-14)
H15	Former Coal Storage (H-15)
H16	Former Sewage Treatment Area (H-16)
H17	Open Pits (H-17)
H18	Drum Location (H-18)
H19	Former AST (H-19)
H2	Drum Location (H-2)
H20	Drum Location (H-20)
H21	Open Pits (H-21)
H22	Drum Site (H-22)
H3	Drum Site (H-3)
H4	Construction Debris Area (H-4)
H5	Drum Location with Construction Debris (H-5)
H6	Construction Debris Area (H-6)
H7	H-7 Boiler
H8	H-8 Boiler
H9	Possible Boiler (H-9)
MP	Motor Pool
P113	Plotting Room 113
STA	Building 20 (Tank A)
STB	Suspected Tank B
STC	Building 2 (Tank C)
STD	Building 104R (Tank D)
STE	Building 3001 (Tank E)
STF	Pump House (Tank F)
STG	Pump House (Tank G)
STH	Building 109 (Tank H)
WDS	WDS SB01 - SB03 Chlorine Contact Chamber
WDS	WDS SB04 - SB05 Septic Tank
WDS	WDS SB06 - SB07 Suspected Septic Tank
WDS	WDS SB08 - SB09 Box and Manhole
WDS	WDS SB10 Box
WDS	WDS SB11 Cesspool
WDS	WDS SB12 - SB13 Manholes
WDS	WDS SB14 - SB17 Cesspools
WDS	WDS SB18 - SB19
WDS	WDS SB20 Septic Tank

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AOCs and Prior Sampling Locations

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	April 2017	Figure 1

AOC ID	AOC Name
10	Building 10
034	Former Building 34
107	Electrical Substation
112	Battery 112
201	Building 201
203	Building 203 (LNAPL)
203	Building 203 (broader impacts)
216	Battery 216
2010	Building 2010 (UST 30)
AGC1	AGC Site 1
AGC2	AGC Site 2
AGC3	Camp Hero State Park Bluffs / AGC Site 3
AGC4	AGC Site 4
AST35	AST-35 (H-13)
B113	Battery 113
EFO	Engineering Field Office
F100C	Building F100C (UST 34)
FPH	FPH for AST-35
H1	Drum Location (H-1)
H11	Former Power Plant (H-11)
H12	Sewage Ejector Station (H-12)
H14	Former Coal Storage (H-14)
H15	Former Coal Storage (H-15)
H16	Former Sewage Treatment Area (H-16)
H17	Open Pits (H-17)
H18	Drum Location (H-18)
H19	Former AST (H-19)
H2	Drum Location (H-2)
H20	Drum Location (H-20)
H21	Open Pits (H-21)
H22	Drum Site (H-22)
H3	Drum Site (H-3)
H4	Construction Debris Area (H-4)
H5	Drum Location with Construction Debris (H-5)
H6	Construction Debris Area (H-6)
H7	H-7 Boiler
H8	H-8 Boiler
H9	Possible Boiler (H-9)
MP	Motor Pool
P113	Plotting Room 113
STA	Building 20 (Tank A)
STB	Suspected Tank B
STC	Building 2 (Tank C)
STD	Building 104R (Tank D)
STE	Building 3001 (Tank E)
STF	Pump House (Tank F)
STG	Pump House (Tank G)
STH	Building 109 (Tank H)
WDS	WDS SB01 - SB03 Chlorine Contact Chamber
WDS	WDS SB04 - SB05 Septic Tank
WDS	WDS SB06 - SB07 Suspected Septic Tank
WDS	WDS SB08 - SB09 Box and Manhole
WDS	WDS SB10 Box
WDS	WDS SB11 Cesspool
WDS	WDS SB12 - SB13 Manholes
WDS	WDS SB14 - SB17 Cesspools
WDS	WDS SB18 - SB19
WDS	WDS SB20 Septic Tank

Surface water features obtained from National Hydrography Dataset (NHD). Dates of publication vary.

Wetlands shapes from New York State Department of Environmental Conservation (NYSDEC).

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

0 75 150 300 Feet
1 inch = 150 feet

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AOCs and Prior Sampling Locations with Exceedances of Preliminary Screening Values

Camp Hero Remedial Investigation
Montauk, New York

PROJECT NO.	PREPARED BY:	DATE:	
60443903	JB	April 2017	**Figure 2**

Tables

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Table 1
Selection of Ecological Screening Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical	CAS No.	Terrestrial Plants (mg/kg)	Soil Invertebrates (mg/kg)	Wildlife (mg/kg)	Selected Ecological Criteria [11] (mg/kg)
Explosives					
1,3,5-Trinitrobenzene	99-35-4		10 [4]	120 [4]	10
1,3-Dinitrobenzene	99-65-0		0.08 [4]	0.73 [4]	0.08
2,4,6-Trinitrotoluene	118-96-7	62 [4]	32 [4]	7.6 [4]	7.6
2,4-Dinitrotoluene	121-14-2	6 [4]	18 [4]	13 [4]	6
2,6-Dinitrotoluene	606-20-2		30 [4]	4.1 [4]	4.1
2-Amino-4,6-dinitrotoluene	35572-78-2	14 [4]	43 [4]	15 [4]	14
2-Nitrotoluene	88-72-2		0.19 [4]	9.9 [4]	0.19
3-Nitrotoluene	99-08-1				
4-Amino-2,6-Dinitro Toluene	19406-51-0	33 [4]	18 [4]	12 [4]	12
4-Nitrotoluene	99-99-0		0.14 [4]	22 [4]	0.14
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4		8.4 [4]	2.3 [4]	2.3
Methyl-2,4,6-trinitrophenylnitramine	479-45-8			1.5 [4]	1.5
Nitrobenzene	98-95-3		40 [3]	4.9 [6]	4.9
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	2700 [4]	16 [4]	300 [4]	16
Metals					
Antimony	7440-36-0	5 [2]	78 [1]	0.27 [1]	0.27
Arsenic	7440-38-2	18 [1]	60 [3]	43 [1]	18
Barium	7440-39-3	500 [2]	330 [1]	2000 [1]	330
Beryllium	7440-41-7	10 [2]	40 [1]	21 [1]	10
Cadmium	7440-43-9	32 [1]	140 [1]	0.36 [1]	0.36
Calcium	7440-70-2				
Chromium	7440-47-3	1 [2]	0.4 [3]	26 [1, 9]	0.4
Cobalt	7440-48-4	13 [1]		120 [1]	13
Copper	7440-50-8	70 [1]	80 [1]	28 [1]	28
Iron	7439-89-6				
Lead	7439-92-1	120 [1]	1700 [1]	11 [1]	11
Magnesium	7439-95-4				
Manganese	7439-96-5	220 [1]	450 [1]	4000 [1]	220
Mercury	7439-97-6	0.3 [2]	0.1 [3]	0.00051 [5, 10]	0.00051
Nickel	7440-02-0	38 [1]	280 [1]	130 [1]	38
Potassium	7440-09-7				
Selenium	7782-49-2	0.52 [1]	4.1 [1]	0.63 [1]	0.52
Silver	7440-22-4	560 [1]		4.2 [1]	4.2
Sodium	82115-62-6				
Thallium	7440-28-0	1 [2]		2.1 [5]	1
Vanadium	7440-62-2	2 [2]		7.8 [1]	2
Zinc	7440-66-6	160 [1]	120 [1]	46 [1]	46
PCBs					
Aroclor 1016	12674-11-2			1 [4]	1
Aroclor 1221	11104-28-2				
Aroclor 1232	11141-16-5				
Aroclor 1242	53469-21-9			0.041 [4]	0.041
Aroclor 1248	12672-29-6			0.0072 [4]	0.0072
Aroclor 1254	11097-69-1	160 [4]		0.041 [4]	0.041
Aroclor 1260	11096-82-5			0.88 [4]	0.88
PCBs, total	1336-36-3	40 [2]	0.33 [4]	0.371 [5]	0.33
SVOCs					
2,4,5-Trichlorophenol	95-95-4	4 [2]	9 [3]		4
2,4,6-Trichlorophenol	88-06-2		10 [3]		10
2,4-Dichlorophenol	120-83-2	20 [2, 7]	0.05 [4]		0.05
2,4-Dimethylphenol	105-67-9		0.04 [4]		0.04
2,4-Dinitrophenol	51-28-5	20 [2]	0.15 [4]		0.15
2-Chloronaphthalene	91-58-7				
2-Chlorophenol	95-57-8	7 [2, 8]	0.06 [4]	0.39 [6]	0.06
2-Methylnaphthalene	91-57-6		29 [1]	16 [6]	16
2-Methylphenol	95-48-7	0.67 [4]	0.1 [4]	590 [6]	0.1
2-Nitroaniline	88-74-4			5.4 [4]	5.4
2-Nitrophenol	88-75-5				
3,3'-Dichlorobenzidine	91-94-1		0.03 [4]		0.03
3-Nitroaniline	99-09-2				
4,6-Dinitro-2-methylphenol	534-52-1				
4-Bromophenyl-phenylether	101-55-3				
4-Chloro-3-methylphenol	59-50-7				
4-Chloroaniline	106-47-8	1 [4]	1.8 [4]		1
4-Chlorophenyl-phenylether	7005-72-3				
4-Methylphenol	106-44-5		0.08 [4]		0.08
4-Nitroaniline	100-01-6				
4-Nitrophenol	100-02-7		7 [3]		7
Acenaphthene	83-32-9	20 [2]	29 [1]	120 [6]	20
Acenaphthylene	208-96-8		29 [1]	120 [6]	29
Anthracene	120-12-7	6.8 [4]	29 [1]	210 [6]	6.8
Benzo(a)anthracene	56-55-3	18 [4]	18 [1]	0.8 [6]	0.8
Benzo(a)pyrene	50-32-8		18 [1]	53 [6]	18
Benzo(b)fluoranthene	205-99-2	18 [4]	18 [1]	38 [6]	18
Benzo(g,h,i)perylene	191-24-2		18 [1]	24 [6]	18
Benzo(k)fluoranthene	207-08-9		18 [1]	62 [6]	18
Bis(2-chloroethoxy)methane	111-91-1				
Bis(2-chloroethyl)ether	111-44-4				
Bis(2-chloroisopropyl)ether	39638-32-9				
Bis(2-ethylhexyl)phthalate	117-81-7		0.23 [4]	0.02 [6]	0.02
ButylBenzylPhthalate	85-68-7		0.59 [4]	90 [6]	0.59
Chrysene	218-01-9		18 [1]	2.4 [6]	2.4
Dibenz(a,h)anthracene	53-70-3		18 [1]	12 [6]	12
Dibenzofuran	132-64-9	6.1 [4]	0.15 [4]		0.15
DiethylPhthalate	84-66-2	100 [2]	0.23 [4]	3600 [6]	0.23

Table 1
Selection of Ecological Screening Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical	CAS No.	Terrestrial Plants (mg/kg)	Soil Invertebrates (mg/kg)	Wildlife (mg/kg)	Selected Ecological Criteria (11) (mg/kg)
DimethylPhthalate	131-11-3		200 (3)	38 (6)	38
Di-n-butylPhthalate	84-74-2	200 (2)	0.22 (4)	0.011 (6)	0.011
Di-n-octylPhthalate	117-84-0		0.21 (4)	0.91 (6)	0.21
Fluoranthene	206-44-0		10 (4)	22 (6)	10
Fluorene	86-73-7		30 (3)	250 (6)	30
Hexachlorobenzene	118-74-1	10 (4)	10 (4)	0.079 (6)	0.079
Hexachlorobutadiene	87-68-3		0.1 (4)		0.1
Hexachlorocyclopentadiene	77-47-4	10 (2)	0.001 (4)		0.001
Hexachloroethane	67-72-1		0.024 (4)		0.024
Indeno(1,2,3-cd)pyrene	193-39-5		18 (1)	62 (6)	18
Isophorone	78-59-1				
Naphthalene	91-20-3	1 (4)	29 (1)	3.4 (6)	1
N-Nitroso-di-N-propylamine	621-64-7				
N-Nitrosodiphenylamine	86-30-6		20 (3)		20
Pentachlorophenol	87-86-5	5 (1)	31 (1)	2.1 (1)	2.1
Phenanthrene	85-01-8		5.5 (4)	10 (6)	5.5
Phenol	108-95-2	70 (2)	30 (3)	38 (6)	30
Pyrene	129-00-0		10 (4)	22 (6)	10
Total HMW PAHs	CALC-HMW PAHs		18 (1)	1.1 (1)	1.1
Total LMW PAHs	CALC-LMW PAHs		29 (1)	100 (1)	29
VOCs					
1,1,1,2-Tetrachloroethane	630-20-6		0.07 (4)		0.07
1,1,1-Trichloroethane	71-55-6		0.04 (4)	260 (6)	0.04
1,1,2,2-Tetrachloroethane	79-34-5		0.19 (4)		0.19
1,1,2-Trichloroethane	79-00-5		0.32 (4)		0.32
1,1-Dichloroethane	75-34-3		0.14 (4)	210 (6)	0.14
1,1-Dichloroethene	75-35-4		0.04 (4)	11 (6)	0.04
1,1-Dichloropropene	563-58-6				
1,2,3-Trichlorobenzene	87-61-6		20 (3)		20
1,2,3-Trichloropropane	96-18-4				
1,2,4-Trichlorobenzene	120-82-1		20 (3)	0.27 (6)	0.27
1,2,4-Trimethylbenzene	95-63-6		0.09 (4)		0.09
1,2-Dibromo-3-chloropropane	96-12-8				
1,2-Dibromoethane	106-93-4				
1,2-Dichlorobenzene	95-50-1		0.09 (4)	0.92 (6)	0.09
1,2-Dichloroethane	107-06-2		0.4 (4)	0.85 (6)	0.4
1,2-Dichloropropane	78-87-5		700 (3)		700
1,3,5-Trimethylbenzene	108-67-8		0.16 (4)		0.16
1,3-Dichlorobenzene	541-73-1		0.08 (4)	0.73 (6)	0.08
1,3-Dichloropropane	142-28-9				
1,4-Dichlorobenzene	106-46-7		20 (3)	0.88 (6)	0.88
2,2-Dichloropropane	594-20-7				
2-Chlorotoluene	95-49-8				
4-Chlorotoluene	106-43-4				
Benzene	71-43-2		0.12 (4)	24 (6)	0.12
Bromobenzene	108-86-1				
Bromochloromethane	74-97-5				
Bromodichloromethane	75-27-4				
Bromoform	75-25-2		0.07 (4)		0.07
Bromomethane	74-83-9		0.002 (4)		0.002
Carbon Tetrachloride	56-23-5		0.05 (4)		0.05
Chlorobenzene	108-90-7		40 (3)	43 (6)	40
Chloroethane	75-00-3				
Chloroform	67-66-3		0.05 (4)	8 (6)	0.05
Chloromethane	74-87-3				
cis-1,2-Dichloroethene	156-59-2		0.04 (4)		0.04
Dibromochloromethane	124-48-1				
Dibromomethane	74-95-3				
Dichlorodifluoromethane	75-71-8				
Ethylbenzene	100-41-4		0.27 (4)		0.27
Isopropylbenzene	98-82-8		0.04 (4)		0.04
Methylene Chloride	75-09-2			2.6 (6)	2.6
n-Butylbenzene	104-51-8				
n-Propylbenzene	103-65-1				
p-Isopropyltoluene	99-87-6		0.18 (4)		0.18
sec-Butylbenzene	135-98-8				
Styrene	100-42-5	300 (2)	1.2 (4)		1.2
tert-Butylbenzene	98-06-6				
Tetrachloroethene	127-18-4	10 (4)	0.06 (4)	0.18 (6)	0.06
Toluene	108-88-3	200 (2)	0.15 (4)	23 (6)	0.15
trans-1,2-Dichloroethene	156-60-5		0.04 (4)		0.04
Trichloroethene	79-01-6			42 (6)	42
Trichlorofluoromethane	75-69-4			52 (4)	52
Vinyl Chloride	75-01-4			0.12 (6)	0.12
Xylene, m-	108-38-3				
Xylene, Mixture	1330-20-7	100 (4)	0.1 (4)	1.4 (6)	0.1
Xylene, o-	95-47-6				
Xylene, P-	106-42-3				

Table 1
Selection of Ecological Screening Criteria
Camp Hero Remedial Investigation
Montauk, New York

Notes:
All units are in milligrams per kilogram (mg/kg).
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
VOC - Volatile Organic Compound.
USEPA - United States Environmental Protection Agency.

1. USEPA 2005. Guidance for Developing Ecological Soil Screening Levels. Office of Emergency and Remedial Response Washington D.C., November 2003, Revised February 2005. Includes interim documents 2006 through 2008. Lower of bird and mammal values selected for wildlife.
2. Efroymson et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants. 1997 Revision, Oak Ridge National Laboratory Oak Ridge, TN, ES/ER/TM-85/R3.
3. Efroymson et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Soil and litter Invertebrates and Hetertropyic Process: Revision 1997, Oak Ridge National Laboratory Oak Ridge, TN, ES/ER/TM-126/R2.
4 - USEPA Region 4. 2015. Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment.
http://www.epa.gov/sites/production/files/2015-09/documents/r4_era_guidance_document_draft_final_8-25-2015.pdf. Soil screening values presented in Table 3.
Lower of bird and mammal values selected for wildlife.
5 - Efroymson et al. 1997. Preliminary Remediation Goals for Ecological Endpoints, Oak Ridge National Laboratory Oak Ridge, TN, ES/ER/TM-162/R2. Lowest available bird or mammal value selected for wildlife.
6 - LANL 2015. Ecorisk Database, Release 3.3. Los Alamos National Laboratory (LANL). September 2015. Lowest available bird or mammal value selected for wildlife.
7. 3,4-dichlorophenol used as a surrogate.
8. 3-chlorophenol used as a surrogate.
9. Value is for trivalent chromium (lower of available values for trivalent and hexavalent chromium).
10. Value is for methylmercury.
11. Selected ecological criteria is the lowest of the selected values for plants, invertebrates, and wildlife.

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Table 2
Calculation of Selected Surface Soil Screening Values without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	Selected Ecological Criteria (1) (mg/kg)	EPA Residential THQ=0.1 (2) (mg/kg)	NYCRR 6-375 Residential SCO (3) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Surface Soil BTV (4) (mg/kg)	Selected Surface Soil Criteria (5) (mg/kg)
Explosives							
1,3,5-Trinitrobenzene	99-35-4	10	220		10		10
1,3-Dinitrobenzene	99-65-0	0.08	0.63		0.08		0.08
2,4,6-Trinitrotoluene	118-96-7	7.6	3.6		3.6		3.6
2,4-Dinitrotoluene	121-14-2	6	1.7		1.7		1.7
2,6-Dinitrotoluene	606-20-2	4.1	0.36		0.36		0.36
2-Amino-4,6-dinitrotoluene	35572-78-2	14	15		14		14
2-Nitrotoluene	88-72-2	0.19	3.2		0.19		0.19
3-Nitrotoluene	99-08-1		0.63		0.63		0.63
4-Amino-2,6-Dinitro Toluene	19406-51-0	12	15		12		12
4-Nitrotoluene	99-99-0	0.14	25		0.14		0.14
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	2.3	6.1		2.3		2.3
Methyl-2,4,6-trinitrophenylnitramine	479-45-8	1.5	16		1.5		1.5
Nitrobenzene	98-95-3	4.9	5.1		4.9		4.9
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	16	390		16		16
Metals							
Aluminum	7429-90-5		7700		7700	27822	27822
Antimony	7440-36-0	0.27	3.1		0.27	5.6	5.6
Arsenic	7440-38-2	13	0.68	16	0.68	3.383	3.383
Barium	7440-39-3	330	1500	350	330	56.3	330
Beryllium	7440-41-7	10	16	14	10	0.815	10
Cadmium	7440-43-9	0.36	7.1	2.5	0.36	0.18	0.36
Calcium (Ca)	7440-70-2				0	751.8	751.8
Chromium	7440-47-3	0.4	0.3		0.3	33.92	33.92
Cobalt	7440-48-4	13	2.3		2.3	4.85	4.85
Copper	7440-50-8	28	310	270	28	57.2	57.2
Iron (Fe)	7439-89-6		5500		5500	19000	19000
Lead	7439-92-1	11	400	400	11	10.14	11
Magnesium (Mg)	7439-95-4				0	3186	3186
Manganese (Mn)	7439-96-5	220	180	2000	180	155.6	180
Nickel	7440-02-0	30	150	140	30	18.21	30
Potassium (K)	2023695				0	940	940
Selenium	7782-49-2	0.52	39	36	0.52	0.77	0.77
Silver	7440-22-4	2	39	36	2	0.66	2
Sodium (Na)	7440-23-5				0	122.5	122.5
Thallium	7440-28-0	1	0.078		0.078	0.14	0.14
Vanadium	7440-62-2	2	39		2	46.28	46.28
Zinc	7440-66-6	46	2300	2200	46	42.36	46
PCBs							
Aroclor 1016	12674-11-2	1	0.41		0.41		0.41
Aroclor 1221	11104-28-2		0.2		0.2		0.2
Aroclor 1232	11141-16-5		0.17		0.17		0.17
Aroclor 1242	53469-21-9	0.041	0.23		0.041		0.041
Aroclor 1248	12672-29-6	0.0072	0.23		0.0072		0.0072
Aroclor 1254	11097-69-1	0.041	0.12		0.041		0.041
Aroclor 1260	11096-82-5	0.88	0.24		0.24		0.24
Aroclor 1262	37324-23-5		0.24		0.24		0.24
Aroclor 1268	11100-14-4		0.24		0.24		0.24
SVOCs							
1,2,4-Trichlorobenzene	120-82-1	0.27	5.8		0.27		0.27
1,2-Dichlorobenzene	95-50-1	0.09	180	100	0.09		0.09
1,3-Dichlorobenzene	541-73-1	0.08	180	17	0.08		0.08
1,4-Dichlorobenzene	106-46-7	0.88	2.6	9.8	0.88		0.88
1-Methylnaphthalene	90-12-0		18		18	0.00578	18
2,4,5-Trichlorophenol	95-95-4	4	630		4		4
2,4,6-Trichlorophenol	88-06-2	10	6.3		6.3		6.3
2,4-Dichlorophenol	120-83-2	0.05	19		0.05		0.05
2,4-Dimethylphenol	105-67-9	0.04	130		0.04		0.04
2,4-Dinitrophenol	51-28-5	0.15	13		0.15		0.15
2,4-Dinitrotoluene	121-14-2	6	1.7		1.7		1.7
2,6-Dinitrotoluene	606-20-2	4.1	0.36		0.36		0.36
2-Chloronaphthalene	91-58-7		480		480		480
2-Chlorophenol	95-57-8	0.06	39		0.06		0.06
2-Methylnaphthalene	91-57-6	16	24		16	0.016	16
2-Methylphenol	95-48-7	0.1	320	100	0.1		0.1

Table 2
Calculation of Selected Surface Soil Screening Values without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	Selected Ecological Criteria [1] (mg/kg)	EPA Residential THQ=0.1 [2] (mg/kg)	NYCRR 6-375 Residential SCO [3] (mg/kg)	Minimum of Agency Criteria (mg/kg)	Surface Soil BTV [4] (mg/kg)	Selected Surface Soil Criteria [5] (mg/kg)
2-Nitroaniline	88-74-4	5.4	63		5.4		5.4
2-Nitrophenol	88-75-5		13		13		13
3,3-Dichlorobenzidine	91-94-1	0.03	1.2		0.03		0.03
3-Nitroaniline	99-09-2		63		63		63
4,6-Dinitro-2-methylphenol	534-52-1		0.51		0.51		0.51
4-Chloro-3-methylphenol	59-50-7		630		630		630
4-Chloroaniline	106-47-8	1	2.7		1		1
4-Nitroaniline	100-01-6		25		25		25
4-Nitrophenol	100-02-7	7	13		7		7
Acenaphthene	83-32-9	20	360	100	20	0.0305	20
Acenaphthylene	208-96-8	29	360	100	29	0.00072	29
Anthracene	120-12-7	6.8	1800	100	6.8	0.0481	6.8
Benzo(a)anthracene	56-55-3	0.8	1.13	1	0.8	0.138	0.8
Benzo(a)pyrene	50-32-8	2.6	0.115	1	0.115	0.247	0.247
Benzo(b)fluoranthene	205-99-2	18	1.15	1	1	0.334	1
Benzo(g,h,i)perylene	191-24-2	18	180	100	18	0.0664	18
Benzo(k)fluoranthene	207-08-9	18	11.5	1	1	0.12	1
Benzoic acid	65-85-0		25000		25000		25000
Benzyl Alcohol	100-51-6		630		630		630
Bis(2-chloro-1-methylethyl) ether	108-60-1		310		310		310
Bis(2-chloroethoxy)methane	111-91-1		19		19		19
Bis(2-chloroethyl)ether	111-44-4		0.23		0.23		0.23
Bis(2-ethylhexyl)phthalate	117-81-7	0.02	39		0.02		0.02
Butyl benzyl phthalate	85-68-7	0.59	290		0.59		0.59
CARBAZOLE	86-74-8		240		240		240
Chrysene	218-01-9	2.4	115	1	1	0.13	1
Dibenz(a,h)anthracene	53-70-3	12	0.115	0.33	0.115	0.00072	0.115
Dibenzofuran	132-64-9	0.15	7.3	14	0.15		0.15
Diethyl phthalate	84-66-2	0.23	5100		0.23		0.23
Dimethyl phthalate	131-11-3	38	5100		38		38
Di-n-butyl phthalate	84-74-2	0.011	630		0.011		0.011
Di-n-octyl phthalate	117-84-0	0.21	63		0.21		0.21
Fluoranthene	206-44-0	10	240	100	10	0.733	10
Fluorene	86-73-7	30	240	100	30	0.0304	30
Hexachlorobenzene	118-74-1	0.079	0.21	0.33	0.079		0.079
Hexachlorobutadiene	87-68-3	0.1	1.2		0.1		0.1
Hexachloroethane	67-72-1	0.024	1.8		0.024		0.024
Indeno(1,2,3-cd)pyrene	193-39-5	18	1.15	0.5	0.5	0.298	0.5
Isophorone	78-59-1		570		570		570
Naphthalene	91-20-3	1	3.8	100	1	0.016	1
n-Nitrosodimethylamine	62-75-9		0.002		0.002		0.002
n-Nitroso-di-n-propylamine	621-64-7		0.078		0.078		0.078
n-Nitrosodiphenylamine	86-30-6	20	110		20		20
Pentachlorophenol	87-86-5	0.8	1	2.4	0.8		0.8
Phenanthrene	85-01-8	5.5	1800	100	5.5	0.362	5.5
Phenol	108-95-2	30	1900	100	30		30
Pyrene	129-00-0	10	180	100	10	0.278	10
Total BaP PAHs Calculated	CALC-BaP TEQ		0.115		0.115	0.493	0.493
Total HMW PAHs Calculated	CALC-HMW PAHs	1.1	0.115		0.115	1.791	1.791
Total LMW PAHs Calculated	CALC-LMW PAHs	29	3.8		3.8	1.026	3.8
VOCs							
1,1,1,2-Tetrachloroethane	630-20-6	0.07	2		0.07		0.07
1,1,1-Trichloroethane	71-55-6	0.04	810	100	0.04		0.04
1,1,2,2-Tetrachloroethane	79-34-5	0.19	0.6		0.19		0.19
1,1,2-Trichloroethane	79-00-5	0.32	0.15		0.15		0.15
1,1-Dichloroethane	75-34-3	0.14	3.6	19	0.14		0.14
1,1-Dichloroethene	75-35-4	0.04	23	100	0.04		0.04
1,2,3-Trichloropropane	96-18-4		0.0051		0.0051		0.0051
1,2,4-Trimethylbenzene	95-63-6	0.09	5.8	47	0.09		0.09
1,2-Dibromo-3-chloropropane	96-12-8		0.0053		0.0053		0.0053
1,2-Dibromoethane	106-93-4		0.036		0.036		0.036
1,2-Dichloroethane	107-06-2	0.4	0.46	2.3	0.4		0.4
1,2-Dichloropropane	78-87-5	700	1		1		1
1,3,5-Trimethylbenzene	108-67-8	0.16	78	47	0.16		0.16
2-Butanone	78-93-3		2700	100	100		100

Table 2
Calculation of Selected Surface Soil Screening Values without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	Selected Ecological Criteria [1] (mg/kg)	EPA Residential THQ=0.1 [2] (mg/kg)	NYCRR 6-375 Residential SCO [3] (mg/kg)	Minimum of Agency Criteria (mg/kg)	Surface Soil BTV [4] (mg/kg)	Selected Surface Soil Criteria [5] (mg/kg)
2-Hexanone	591-78-6		20		20		20
4-Isopropyltoluene	99-87-6	0.18	190		0.18		0.18
Acetone	67-64-1		6100	100	100		100
Benzene	71-43-2	0.12	1.2	2.9	0.12		0.12
Bromodichloromethane	75-27-4		0.29		0.29		0.29
Bromoform	75-25-2	0.07	19		0.07		0.07
Carbon disulfide	75-15-0		77		77		77
Carbon tetrachloride	56-23-5	0.05	0.65	1.4	0.05		0.05
Chlorobenzene	108-90-7	40	28	100	28		28
Chloroethane	75-00-3		1400		1400		1400
Chloroform	67-66-3	0.05	0.32	10	0.05		0.05
Chloromethane	74-87-3		11		11		11
cis-1,2-Dichloroethene	156-59-2	0.04	16	59	0.04		0.04
Dibromochloromethane	124-48-1		8.3		8.3		8.3
Dichlorodifluoromethane	75-71-8		8.7		8.7		8.7
Ethylbenzene	100-41-4	0.27	5.8	30	0.27		0.27
Isopropylbenzene	98-82-8	0.04	190		0.04		0.04
Methyl tert-butyl ether	1634-04-4		47	62	47		47
Methylene chloride	75-09-2	2.6	35	51	2.6		2.6
Naphthalene	91-20-3	1	3.8	100	1	0.016	1
n-Butylbenzene	104-51-8		390	100	100		100
n-Propylbenzene	103-65-1		380	100	100		100
sec-Butylbenzene	135-98-8		780	100	100		100
Styrene	100-42-5	1.2	600		1.2		1.2
tert-Butylbenzene	98-06-6		780	100	100		100
Tetrachloroethene	127-18-4	0.06	8.1	5.5	0.06		0.06
Toluene	108-88-3	0.15	490	100	0.15		0.15
trans-1,2-Dichloroethene	156-60-5	0.04	160	100	0.04		0.04
trans-1,3-Dichloropropene	10061-02-6		1.8		1.8		1.8
trans-1,3-Dichloropropene	542-75-6		1.8		1.8		1.8
Trichloroethene	79-01-6	2	0.41	10	0.41		0.41
Trichlorofluoromethane	75-69-4	52	2300		52		52
Vinyl Acetate	108-05-4		91		91		91
Vinyl chloride	75-01-4	0.12	0.059	0.21	0.059		0.059
Xylenes (total)	1330-20-7	0.1	58	100	0.1		0.1

Notes:
All units are in milligrams per kilogram (mg/kg).
BTV - Background Threshold Value.
NYCRR - New York Codes, Rules, and Regulations.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
RSL - Regional Screening Level.
SCO - Soil Cleanup Objective.
THQ - Target Hazard Quotient.
USEPA - United States Environmental Protection Agency.
1. See Table 1 for ecological screening criteria selection.
2. USEPA Regional Screening Levels for Residential Soil with a Target Hazard Quotient (THQ) of 0.1 (USEPA 2016), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017).
3. New York Codes, Rules, and Regulations (NYCRR) Chapter 6, Part 375-1 Remedial Program Residential Soil Cleanup Objectives (SCOs), Table 6.8(b) (NYCRR 2015).
4. Details on the development of the soil BTVs are presented in Appendix C of the Phase III Remedial Investigation Sampling and Analysis Plan.
5. Selected criteria is the higher of the Minimum of Agency Criteria and the BTV.

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Table 3
Calculation of Selected Surface Soil Screening Values with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	Selected Ecological Criteria [1] (mg/kg)	EPA Residential THQ=0.1 [2] (mg/kg)	NYCRR 6-375 Residential SCO [3] (mg/kg)	NYSDEC CP-51 SCL for Gasoline and Fuel Oil [4] (mg/kg)	NYSDEC CP-51 Supplemental Residential SCO [5] (mg/kg)	Minimum of Agency Criteria (mg/kg)	Surface Soil BTV [6] (mg/kg)	Selected Surface Soil Criteria [7] (mg/kg)
Explosives									
2,6-Dinitrotoluene	606-20-2	4.1	0.36			1.03	0.36		0.36
Nitrobenzene	98-95-3	4.9	5.1			3.7	3.7		3.7
SVOCs									
2,4,5-Trichlorophenol	95-95-4	4	630			100	4		4
2,4-Dichlorophenol	120-83-2	0.05	19			100	0.05		0.05
2,4-Dinitrophenol	51-28-5	0.15	13			100	0.15		0.15
2,6-Dinitrotoluene	606-20-2	4.1	0.36			1.03	0.36		0.36
2-Chlorophenol	95-57-8	0.06	39			100	0.06		0.06
4-Chloroaniline	106-47-8	1	2.7			100	1		1
Acenaphthene	83-32-9	20	360	100	20		20	0.0305	20
Acenaphthylene	208-96-8	29	360	100	100		29	0.00072	29
Anthracene	120-12-7	6.8	1800	100	100		6.8	0.0481	6.8
Benzo(a)anthracene	56-55-3	0.8	1.13	1	1		0.8	0.138	0.8
Benzo(a)pyrene	50-32-8	2.6	0.115	1	1		0.115	0.247	0.247
Benzo(b)fluoranthene	205-99-2	18	1.15	1	1		1	0.334	1
Benzo(g,h,i)perylene	191-24-2	18	180	100	100		18	0.0664	18
Benzo(k)fluoranthene	207-08-9	18	11.5	1	0.8		0.8	0.12	0.8
Benzoic acid	65-85-0		25000			100	100		100
Bis(2-ethylhexyl)phthalate	117-81-7	0.02	39			50	0.02		0.02
Butyl benzyl phthalate	85-68-7	0.59	290			100	0.59		0.59
Chrysene	218-01-9	2.4	115	1	1		1	0.13	1
Dibenz(a,h)anthracene	53-70-3	12	0.115	0.33	0.33		0.115	0.00072	0.115
Diethyl phthalate	84-66-2	0.23	5100			100	0.23		0.23
Dimethyl phthalate	131-11-3	38	5100			100	38		38
Di-n-butyl phthalate	84-74-2	0.011	630			100	0.011		0.011
Di-n-octyl phthalate	117-84-0	0.21	63			100	0.21		0.21
Fluoranthene	206-44-0	10	240	100	100		10	0.733	10
Fluorene	86-73-7	30	240	100	30		30	0.0304	30
Hexachlorobenzene	118-74-1	0.079	0.21	0.33		0.41	0.079		0.079
Indeno(1,2,3-cd)pyrene	193-39-5	18	1.15	0.5	0.5		0.5	0.298	0.5
Isophorone	78-59-1		570			100	100		100
Nitrobenzene	98-95-3	4.9	5.1			3.7	3.7		3.7
Phenanthrene	85-01-8	5.5	1800	100	100		5.5	0.362	5.5
Pyrene	129-00-0	10	180	100	100		10	0.278	10
Total BaP PAHs Calculated	CALC-BaP TEQ		0.115		1		0.115	0.493	0.493
Total HMW PAHs Calculated	CALC-HMW PAHs	1.1	0.115		1		0.115	1.791	1.791
Total LMW PAHs Calculated	CALC-LMW PAHs	29	3.8		12		3.8	1.026	3.8
VOCs									
1,2,4-Trimethylbenzene	95-63-6	0.09	5.8	47	3.6		0.09		0.09
1,3,5-Trimethylbenzene	108-67-8	0.16	78	47	8.4		0.16		0.16
4-Isopropyltoluene	99-87-6	0.18	190		10		0.18		0.18
Benzene	71-43-2	0.12	1.2	2.9	0.06		0.06		0.06
Ethylbenzene	100-41-4	0.27	5.8	30	1		0.27		0.27
Isopropylbenzene	98-82-8	0.04	190		2.3	100	0.04		0.04
Methyl tert-butyl ether	1634-04-4		47	62	0.93		0.93		0.93
Naphthalene	91-20-3	1	3.8	100	12		1	0.016	1
n-Butylbenzene	104-51-8		390	100	12		12		12
n-Propylbenzene	103-65-1		380	100	3.9		3.9		3.9

Table 3
Calculation of Selected Surface Soil Screening Values with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	Selected Ecological Criteria (1) (mg/kg)	EPA Residential THQ=0.1 (2) (mg/kg)	NYCRR 6-375 Residential SCO (3) (mg/kg)	NYSDEC CP-51 SCL for Gasoline and Fuel Oil (4) (mg/kg)	NYSDEC CP-51 Supplemental Residential SCO (5) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Surface Soil BTV (6) (mg/kg)	Selected Surface Soil Criteria (7) (mg/kg)
sec-Butylbenzene	135-98-8		780	100	11		11		11
tert-Butylbenzene	98-06-6		780	100	5.9		5.9		5.9
Toluene	108-88-3	0.15	490	100	0.7		0.15		0.15
Xylenes (total)	1330-20-7	0.1	58	100	0.26		0.1		0.1

Notes:
All units are in milligrams per kilogram (mg/kg).
BTV - Background Threshold Value.
NYCRR - New York Codes, Rules, and Regulations.
NYSDEC - New York State Department of Environmental Conservation.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SCL - Soil Cleanup Level.
SCO - Soil Cleanup Objective.
RSL - Regional Screening Level.
THQ - Target Hazard Quotient.
USEPA - United States Environmental Protection Agency.
1. See Table 1 for ecological screening criteria selection.
2. USEPA Regional Screening Levels for Residential Soil with a Target Hazard Quotient (THQ) of 0.1 (USEPA 2016), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017).
3. New York Codes, Rules, and Regulations (NYCRR) Chapter 6, Part 375-1 Remedial Program Residential Soil Cleanup Objectives (SCOs), Table 6.8(b) (NYCRR 2015).
4. New York State Department of Environmental Conservation (NYSDEC) CP-51 Soil Cleanup Guidance Soil Cleanup Levels (SCLs) for Gasoline and Fuel Oil, Tables 2 and 3 (NYSDEC 2010a).
5. New York State Department of Environmental Conservation (NYSDEC) CP-51 Soil Cleanup Guidance Supplemental Residential SCOs, Table 1 (NYSDEC 2010a).
6. Details on the development of the soil BTVs are presented in Appendix C of the Phase III Remedial Investigation Sampling and Analysis Plan.
7. Selected criteria is the higher of the Minimum of Agency Criteria and the BTV.

Table 4
Calculation of Selected Subsurface Soil Screening Values without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	EPA Residential THQ=0.1 (1) (mg/kg)	NYCRR 6-375 Residential SCO (2) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Subsurface BTV (3) (mg/kg)	Selected Subsurface Soil Criteria (4) (mg/kg)
Explosives						
1,3,5-Trinitrobenzene	99-35-4	220		220		220
1,3-Dinitrobenzene	99-65-0	0.63		0.63		0.63
2,4,6-Trinitrotoluene	118-96-7	3.6		3.6		3.6
2,4-Dinitrotoluene	121-14-2	1.7		1.7		1.7
2,6-Dinitrotoluene	606-20-2	0.36		0.36		0.36
2-Amino-4,6-dinitrotoluene	35572-78-2	15		15		15
2-Nitrotoluene	88-72-2	3.2		3.2		3.2
3-Nitrotoluene	99-08-1	0.63		0.63		0.63
4-Amino-2,6-Dinitro Toluene	19406-51-0	15		15		15
4-Nitrotoluene	99-99-0	25		25		25
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	6.1		6.1		6.1
Methyl-2,4,6-trinitrophenylnitramine	479-45-8	16		16		16
Nitrobenzene	98-95-3	5.1		5.1		5.1
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	390		390		390
Metals						
Aluminum	7429-90-5	7700		7700	27822	27822
Antimony	7440-36-0	3.1		3.1	10.3	10.3
Arsenic	7440-38-2	0.68	16	0.68	3.383	3.383
Barium	7440-39-3	1500	350	350	121.5	350
Beryllium	7440-41-7	16	14	14	0.815	14
Cadmium	7440-43-9	7.1	2.5	2.5	0.17	2.5
Calcium (Ca)	7440-70-2				751.8	751.8
Chromium	7440-47-3	0.3		0.3	33.92	33.92
Cobalt	7440-48-4	2.3		2.3	10.24	10.24
Copper	7440-50-8	310	270	270	57.2	270
Iron (Fe)	7439-89-6	5500		5500	19000	19000
Lead	7439-92-1	400	400	400	5.876	400
Magnesium (Mg)	7439-95-4				8315	8315
Manganese (Mn)	7439-96-5	180	2000	180	656.8	656.8
Nickel	7440-02-0	150	140	140	18.21	140
Potassium (K)	2023695				5660	5660
Selenium	7782-49-2	39	36	36	0.77	36
Silver	7440-22-4	39	36	36	0.66	36
Sodium (Na)	7440-23-5				320	320
Thallium	7440-28-0	0.078		0.078	0.414	0.414
Vanadium	7440-62-2	39		39	46.28	46.28
Zinc	7440-66-6	2300	2200	2200	42.36	2200
PCBs						
Aroclor 1016	12674-11-2	0.41		0.41		0.41
Aroclor 1221	11104-28-2	0.2		0.2		0.2
Aroclor 1232	11141-16-5	0.17		0.17		0.17
Aroclor 1242	53469-21-9	0.23		0.23		0.23
Aroclor 1248	12672-29-6	0.23		0.23		0.23
Aroclor 1254	11097-69-1	0.12		0.12		0.12
Aroclor 1260	11096-82-5	0.24		0.24		0.24
Aroclor 1262	37324-23-5	0.24		0.24		0.24
Aroclor 1268	11100-14-4	0.24		0.24		0.24
SVOCs						
1,2,4-Trichlorobenzene	120-82-1	5.8		5.8		5.8
1,2-Dichlorobenzene	95-50-1	180	100	100		100
1,3-Dichlorobenzene	541-73-1	180	17	17		17
1,4-Dichlorobenzene	106-46-7	2.6	9.8	2.6		2.6
1-Methylnaphthalene	90-12-0	18		18	0.00069	18
2,4,5-Trichlorophenol	95-95-4	630		630		630
2,4,6-Trichlorophenol	88-06-2	6.3		6.3		6.3
2,4-Dichlorophenol	120-83-2	19		19		19
2,4-Dimethylphenol	105-67-9	130		130		130
2,4-Dinitrophenol	51-28-5	13		13		13
2,4-Dinitrotoluene	121-14-2	1.7		1.7		1.7
2,6-Dinitrotoluene	606-20-2	0.36		0.36		0.36
2-Chloronaphthalene	91-58-7	480		480		480
2-Chlorophenol	95-57-8	39		39		39
2-Methylnaphthalene	91-57-6	24		24	0.00069	24

Table 4
Calculation of Selected Subsurface Soil Screening Values without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	EPA Residential THQ=0.1 (1) (mg/kg)	NYCRR 6-375 Residential SCO (2) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Subsurface BTV (3) (mg/kg)	Selected Subsurface Soil Criteria (4) (mg/kg)
2-Methylphenol	95-48-7	320	100	100		100
2-Nitroaniline	88-74-4	63		63		63
2-Nitrophenol	88-75-5	13		13		13
3,3-Dichlorobenzidine	91-94-1	1.2		1.2		1.2
3-Nitroaniline	99-09-2	63		63		63
4,6-Dinitro-2-methylphenol	534-52-1	0.51		0.51		0.51
4-Chloro-3-methylphenol	59-50-7	630		630		630
4-Chloroaniline	106-47-8	2.7		2.7		2.7
4-Nitroaniline	100-01-6	25		25		25
4-Nitrophenol	100-02-7	13		13		13
Acenaphthene	83-32-9	360	100	100	0.00069	100
Acenaphthylene	208-96-8	360	100	100	0.00069	100
Anthracene	120-12-7	1800	100	100	0.00069	100
Benzo(a)anthracene	56-55-3	1.13	1	1	0.00069	1
Benzo(a)pyrene	50-32-8	0.115	1	0.115	0.00069	0.115
Benzo(b)fluoranthene	205-99-2	1.15	1	1	0.00069	1
Benzo(g,h,i)perylene	191-24-2	180	100	100	0.00069	100
Benzo(k)fluoranthene	207-08-9	11.5	1	1	0.00069	1
Benzoic acid	65-85-0	25000		25000		25000
Benzyl Alcohol	100-51-6	630		630		630
Bis(2-chloro-1-methylethyl) ether	108-60-1	310		310		310
Bis(2-chloroethoxy)methane	111-91-1	19		19		19
Bis(2-chloroethyl)ether	111-44-4	0.23		0.23		0.23
Bis(2-ethylhexyl)phthalate	117-81-7	39		39		39
Butyl benzyl phthalate	85-68-7	290		290		290
CARBAZOLE	86-74-8	240		240		240
Chrysene	218-01-9	115	1	1	0.00069	1
Dibenz(a,h)anthracene	53-70-3	0.115	0.33	0.115	0.00069	0.115
Dibenzofuran	132-64-9	7.3	14	7.3		7.3
Diethyl phthalate	84-66-2	5100		5100		5100
Dimethyl phthalate	131-11-3	5100		5100		5100
Di-n-butyl phthalate	84-74-2	630		630		630
Di-n-octyl phthalate	117-84-0	63		63		63
Fluoranthene	206-44-0	240	100	100	0.00069	100
Fluorene	86-73-7	240	100	100	0.00069	100
Hexachlorobenzene	118-74-1	0.21	0.33	0.21		0.21
Hexachlorobutadiene	87-68-3	1.2		1.2		1.2
Hexachloroethane	67-72-1	1.8		1.8		1.8
Indeno(1,2,3-cd)pyrene	193-39-5	1.15	0.5	0.5	0.00069	0.5
Isophorone	78-59-1	570		570		570
Naphthalene	91-20-3	3.8	100	3.8	0.00069	3.8
Nitrobenzene	98-95-3	5.1		5.1		5.1
n-Nitrosodimethylamine	62-75-9	0.002		0.002		0.002
n-Nitroso-di-n-propylamine	621-64-7	0.078		0.078		0.078
n-Nitrosodiphenylamine	86-30-6	110		110		110
Pentachlorophenol	87-86-5	1	2.4	1		1
Phenanthrene	85-01-8	1800	100	100	0.00069	100
Phenol	108-95-2	1900	100	100		100
Pyrene	129-00-0	180	100	100	0.00069	100
Total BaP PAHs Calculated	CALC-BaP TEQ	0.115		0.115	0.00296	0.115
VOCs						
1,1,1,2-Tetrachloroethane	630-20-6	2		2		2
1,1,1-Trichloroethane	71-55-6	810	100	100		100
1,1,2,2-Tetrachloroethane	79-34-5	0.6		0.6		0.6
1,1,2-Trichloroethane	79-00-5	0.15		0.15		0.15
1,1-Dichloroethane	75-34-3	3.6	19	3.6		3.6
1,1-Dichloroethene	75-35-4	23	100	23		23
1,2,3-Trichloropropane	96-18-4	0.0051		0.0051		0.0051
1,2,4-Trimethylbenzene	95-63-6	5.8	47	5.8		5.8
1,2-Dibromo-3-chloropropane	96-12-8	0.0053		0.0053		0.0053
1,2-Dibromoethane	106-93-4	0.036		0.036		0.036
1,2-Dichloroethane	107-06-2	0.46	2.3	0.46		0.46
1,2-Dichloropropane	78-87-5	1		1		1
1,3,5-Trimethylbenzene	108-67-8	78	47	47		47
2-Butanone	78-93-3	2700	100	100		100

Table 4
Calculation of Selected Subsurface Soil Screening Values without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	EPA Residential THQ=0.1 (1) (mg/kg)	NYCRR 6-375 Residential SCO (2) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Subsurface BTV (3) (mg/kg)	Selected Subsurface Soil Criteria (4) (mg/kg)
2-Hexanone	591-78-6	20		20		20
4-Isopropyltoluene	99-87-6	190		190		190
Acetone	67-64-1	6100	100	100		100
Benzene	71-43-2	1.2	2.9	1.2		1.2
Bromodichloromethane	75-27-4	0.29		0.29		0.29
Bromoform	75-25-2	19		19		19
Carbon disulfide	75-15-0	77		77		77
Carbon tetrachloride	56-23-5	0.65	1.4	0.65		0.65
Chlorobenzene	108-90-7	28	100	28		28
Chloroethane	75-00-3	1400		1400		1400
Chloroform	67-66-3	0.32	10	0.32		0.32
Chloromethane	74-87-3	11		11		11
cis-1,2-Dichloroethene	156-59-2	16	59	16		16
Dibromochloromethane	124-48-1	8.3		8.3		8.3
Dichlorodifluoromethane	75-71-8	8.7		8.7		8.7
Ethylbenzene	100-41-4	5.8	30	5.8		5.8
Isopropylbenzene	98-82-8	190		190		190
Methyl tert-butyl ether	1634-04-4	47	62	47		47
Methylene chloride	75-09-2	35	51	35		35
Naphthalene	91-20-3	3.8	100	3.8	0.00069	3.8
n-Butylbenzene	104-51-8	390	100	100		100
n-Propylbenzene	103-65-1	380	100	100		100
sec-Butylbenzene	135-98-8	780	100	100		100
Styrene	100-42-5	600		600		600
tert-Butylbenzene	98-06-6	780	100	100		100
Tetrachloroethene	127-18-4	8.1	5.5	5.5		5.5
Toluene	108-88-3	490	100	100		100
trans-1,2-Dichloroethene	156-60-5	160	100	100		100
trans-1,3-Dichloropropene	10061-02-6	1.8		1.8		1.8
Trichloroethene	79-01-6	0.41	10	0.41		0.41
Trichlorofluoromethane	75-69-4	2300		2300		2300
Vinyl Acetate	108-05-4	91		91		91
Vinyl chloride	75-01-4	0.059	0.21	0.059		0.059
Xylenes (total)	1330-20-7	58	100	58		58

Notes:
All units are in milligrams per kilogram (mg/kg).
BTV - Background Threshold Value.
NYCRR - New York Codes, Rules, and Regulations.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
RSL - Regional Screening Level.
SCO - Soil Cleanup Objective.
THQ - Target Hazard Quotient.
USEPA - United States Environmental Protection Agency.
1. USEPA Regional Screening Levels for Residential Soil with a Target Hazard Quotient (THQ) of 0.1 (USEPA 2016), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017).
2. New York Codes, Rules, and Regulations (NYCRR) Chapter 6, Part 375-1 Remedial Program Residential Soil Cleanup Objectives (SCOs), Table 6.8(b) (NYCRR 2015).
3. Details on the development of the soil BTVs are presented in Appendix C of the Phase III Remedial Investigation Sampling and Analysis Plan.
4. Selected criteria is the higher of the Minimum of Agency Criteria and the BTV.

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Table 5
Calculation of Selected Subsurface Soil Screening Values with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	EPA Residential THQ=0.1 (1) (mg/kg)	NYCRR 6-375 Residential SCO (2) (mg/kg)	NYSDEC CP-51 SCL for Gasoline and Fuel Oil (3) (mg/kg)	NYSDEC CP-51 Supplemental Residential SCO (4) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Subsurface Background BTV (5) (mg/kg)	Selected Subsurface Soil Criteria (6) (mg/kg)
Explosives								
2,6-Dinitrotoluene	606-20-2	0.36			1.03	0.36		0.36
Nitrobenzene	98-95-3	5.1			3.7	3.7		3.7
Metals								
Arsenic	7440-38-2	0.68	16			0.68	3.383	3.383
Barium	7440-39-3	1500	350			350	121.5	350
Beryllium	7440-41-7	16	14			14	0.815	14
Cadmium	7440-43-9	7.1	2.5			2.5	0.17	2.5
Chromium(III), Insoluble Salts	16065-83-1	12000	36			36		36
Chromium(VI)	18540-29-9	0.3	22			0.3		0.3
Cobalt	7440-48-4	2.3			30	2.3	10.24	10.24
Copper	7440-50-8	310	270			270	57.2	270
Iron (Fe)	7439-89-6	5500			2000	2000	19000	19000
Lead	7439-92-1	400	400			400	5.876	400
Manganese (Mn)	7439-96-5	180	2000			180	656.8	656.8
Mercury	7439-97-6	1.1	0.81			0.81		0.81
Nickel	7440-02-0	150	140			140	18.21	140
Selenium	7782-49-2	39	36			36	0.77	36
Silver	7440-22-4	39	36			36	0.66	36
Vanadium	7440-62-2	39			100	39	46.28	46.28
Zinc	7440-66-6	2300	2200			2200	42.36	2200
SVOCs								
1,2-Dichlorobenzene	95-50-1	180	100			100		100
1,3-Dichlorobenzene	541-73-1	180	17			17		17
1,4-Dichlorobenzene	106-46-7	2.6	9.8			2.6		2.6
2,4,5-Trichlorophenol	95-95-4	630			100	100		100
2,4-Dichlorophenol	120-83-2	19			100	19		19
2,4-Dinitrophenol	51-28-5	13			100	13		13
2-Chlorophenol	95-57-8	39			100	39		39
2-Methylnaphthalene	91-57-6	24			0.41	0.41	0.00069	0.41
2-Methylphenol	95-48-7	320	100			100		100
4-Chloroaniline	106-47-8	2.7			100	2.7		2.7
Acenaphthene	83-32-9	360	100	20		20	0.00069	20
Acenaphthylene	208-96-8	360	100	100		100	0.00069	100
Anthracene	120-12-7	1800	100	100		100	0.00069	100
Benzo(a)anthracene	56-55-3	1.13	1	1		1	0.00069	1
Benzo(a)pyrene	50-32-8	0.115	1	1		0.115	0.00069	0.115
Benzo(b)fluoranthene	205-99-2	1.15	1	1		1	0.00069	1
Benzo(g,h,i)perylene	191-24-2	180	100	100		100	0.00069	100
Benzo(k)fluoranthene	207-08-9	11.5	1	0.8		0.8	0.00069	0.8
Benzoic acid	65-85-0	25000			100	100		100
Bis(2-ethylhexyl)phthalate	117-81-7	39			50	39		39
Butyl benzyl phthalate	85-68-7	290			100	100		100
Chrysene	218-01-9	115	1	1		1	0.00069	1
Dibenz(a,h)anthracene	53-70-3	0.115	0.33	0.33		0.115	0.00069	0.115
Diethyl phthalate	84-66-2	5100			100	100		100
Dimethyl phthalate	131-11-3	5100			100	100		100
Di-n-butyl phthalate	84-74-2	630			100	100		100
Di-n-octyl phthalate	117-84-0	63			100	63		63
Fluoranthene	206-44-0	240	100	100		100	0.00069	100
Fluorene	86-73-7	240	100	30		30	0.00069	30
Hexachlorobenzene	118-74-1	0.21	0.33		0.41	0.21		0.21
Indeno(1,2,3-cd)pyrene	193-39-5	1.15	0.5	0.5		0.5	0.00069	0.5
Isophorone	78-59-1	570			100	100		100
Naphthalene	91-20-3	3.8	100	12		3.8	0.00069	3.8
Pentachlorophenol	87-86-5	1	2.4			1		1
Phenanthrene	85-01-8	1800	100	100		100	0.00069	100
Phenol	108-95-2	1900	100			100		100
Pyrene	129-00-0	180	100	100		100	0.00069	100
Total BaP PAHs Calculated	CALC-BaP TEQ	0.115		1		0.115	0.00296	0.115

Table 5
Calculation of Selected Subsurface Soil Screening Values with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Chemical Name	CAS Number	EPA Residential THQ=0.1 (1) (mg/kg)	NYCRR 6-375 Residential SCO (2) (mg/kg)	NYSDEC CP-51 SCL for Gasoline and Fuel Oil (3) (mg/kg)	NYSDEC CP-51 Supplemental Residential SCO (4) (mg/kg)	Minimum of Agency Criteria (mg/kg)	Subsurface Background BTV (5) (mg/kg)	Selected Subsurface Soil Criteria (6) (mg/kg)
VOCs								
1,1,1-Trichloroethane	71-55-6	810	100			100		100
1,1,2,2-Tetrachloroethane	79-34-5	0.6			35	0.6		0.6
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	4000			100	100		100
1,1-Dichloroethane	75-34-3	3.6	19			3.6		3.6
1,1-Dichloroethene	75-35-4	23	100			23		23
1,2,3-Trichloropropane	96-18-4	0.0051			80	0.0051		0.0051
1,2,4-Trimethylbenzene	95-63-6	5.8	47	3.6		3.6		3.6
1,2-Dichloroethane	107-06-2	0.46	2.3			0.46		0.46
1,3,5-Trimethylbenzene	108-67-8	78	47	8.4		8.4		8.4
1,4-Dioxane	123-91-1	5.3	9.8			5.3		5.3
2-Butanone	78-93-3	2700	100		100	100		100
4-Isopropyltoluene	99-87-6	190		10		10		10
Acetone	67-64-1	6100	100			100		100
Benzene	71-43-2	1.2	2.9	0.06		0.06		0.06
Carbon disulfide	75-15-0	77			100	77		77
Carbon tetrachloride	56-23-5	0.65	1.4			0.65		0.65
Chlorobenzene	108-90-7	28	100			28		28
Chloroform	67-66-3	0.32	10			0.32		0.32
cis-1,2-Dichloroethene	156-59-2	16	59			16		16
Ethylbenzene	100-41-4	5.8	30	1		1		1
Isopropylbenzene	98-82-8	190		2.3	100	2.3		2.3
Methyl tert-butyl ether	1634-04-4	47	62	0.93		0.93		0.93
Methylene chloride	75-09-2	35	51			35		35
n-Butylbenzene	104-51-8	390	100	12		12		12
n-Propylbenzene	103-65-1	380	100	3.9		3.9		3.9
sec-Butylbenzene	135-98-8	780	100	11		11		11
tert-Butylbenzene	98-06-6	780	100	5.9		5.9		5.9
Tetrachloroethene	127-18-4	8.1	5.5			5.5		5.5
Toluene	108-88-3	490	100	0.7		0.7		0.7
trans-1,2-Dichloroethene	156-60-5	160	100			100		100
Trichloroethene	79-01-6	0.41	10			0.41		0.41
Vinyl chloride	75-01-4	0.059	0.21			0.059		0.059
Xylenes (total)	1330-20-7	58	100	0.26		0.26		0.26

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
BTV - Background Threshold Value.
NYCRR - New York Codes, Rules, and Regulations.
NYSDEC - New York State Department of Environmental Conservation.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
RSL - Regional Screening Level.
SCL - Soil Cleanup Level.
SCO - Soil Cleanup Objective.
THQ - Target Hazard Quotient.
USEPA - United States Environmental Protection Agency.
1. USEPA Regional Screening Levels for Residential Soil with a Target Hazard Quotient (THQ) of 0.1 (USEPA 2016), with updated PAH RSLs calculated from recently-released updated benzo[a]pyrene toxicity values (USEPA 2017).
2. New York Codes, Rules, and Regulations (NYCRR) Chapter 6, Part 375-1 Remedial Program Residential Soil Cleanup Objectives (SCOs), Table 6.8(b) (NYCRR 2015).
3. New York State Department of Environmental Conservation (NYSDEC) CP-51 Soil Cleanup Guidance Soil Cleanup Levels (SCLs) for Gasoline and Fuel Oil, Tables 2 and 3 (NYSDEC 2010a).
4. New York State Department of Environmental Conservation (NYSDEC) CP-51 Soil Cleanup Guidance Supplemental Residential SCOs, Table 1 (NYSDEC 2010a).
5. Details on the development of the soil BTVs are presented in Appendix C of the Phase III Remedial Investigation Sampling and Analysis Plan.
6. Selected criteria is the higher of the Minimum of Agency Criteria and the BTV.

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-EFO	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H15
	Location ID	034-SB01	034-SS02	034-SS03	034-SS04	034-SS05	EFO-SB01	H1-SS01	H1-SS02	H11-SB02	H12-SB01	H14-SB01	H14-SB02	H14-SB03	H15-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Explosives															
1,3,5-Trinitrobenzene	10						< 0.039 U								
1,3-Dinitrobenzene	0.08						< 0.039 U								
2,4,6-Trinitrotoluene	3.6						< 0.039 U								
2,4-Dinitrotoluene	1.7						< 0.039 U								
2,6-Dinitrotoluene	0.36						< 0.039 U								
2-Amino-4,6-dinitrotoluene	14						< 0.039 U								
2-Nitrotoluene	0.19						< 0.039 U								
3-Nitrotoluene	0.63						< 0.039 U								
4-Amino-2,6-Dinitro Toluene	12						< 0.039 U								
4-Nitrotoluene	0.14						< 0.039 U								
Hexahydro-1,3,5-trinitro-1,3,5-triazine	2.3						< 0.039 U								
Methyl-2,4,6-trinitrophenylnitramine	1.5						< 0.039 U								
Nitrobenzene	4.9						< 0.039 U								
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	16						< 0.039 U								
Metals															
Aluminum	27822	9600	8400	8600 J	9100	9900		4300	3700	13000	3200	13000	9300	9300	11000
Antimony	**5.6**	1.9	2.0	2.4	3.7	0.73 J		0.78 J	1.3	2.0	1.7	5.5	3.7	4.2	1.9
Arsenic	**3.383**	**5.2**	1.3 J	2.7 J-	1.6	0.85 J		0.90 J	0.86 J	3.3	1.8	2.6	**3.8**	1.9	1.3 J
Barium	330	26	26	16 J+	43	19		19	20	24	23	42	27	29	20
Beryllium	**10**	0.17 J	0.22	< 0.035 U	0.020 J	< 0.045 U		0.063 J	0.85	0.42	0.037 J	0.18	0.052 J	0.10 J	0.26
Cadmium	**0.36**	**0.52**	0.36	0.032 J	0.031 J	0.10 J		0.066 J	**0.69**	0.031 J	0.025 J	0.065 J	0.052 J	0.038 J	0.20
Calcium (Ca)	**751.8**	**2900**	**1000**	660 J+	570	490		**860**	720	**1000**	300	**800**	650	**780**	420
Chromium	33.92	12	10	12 J-	13	11		6.7	5.5	13	7.1	22	15	13	10
Cobalt	**4.85**	2.2	2.2	2.6 J-	3.9	0.87 J		0.78 J	1.4	2.1	1.7	**5.5**	3.7	4.2	1.9
Copper	57.2	24	22	25	33	10		8.4	6.0	26	20	44	32	28	26
Iron (Fe)	19000	8500	8000	11000 J	13000	3100		3300	1700	12000	6900	15000	12000	11000	11000
Lead	**11**	**14**	**15**	8.1	2.7 J	**12**		2.5 J	3.6 J	4.0	**64**	3.3 J	3.8	2.1 J	5.9
Magnesium (Mg)	**3186**	1300	1100	960 J+	2200	550		490	430	1200	830	**3800**	2000	2100	1000
Manganese (Mn)	**180**	120	140	140 J+	**270**	57		43	49	95	77	**190**	130	160	120
Nickel	30	8.2	6.7	5.3	7.2	3.8 J		2.4 J	2.8 J	7.9	3.3 J	13	7.2	7.8	6.1
Potassium (K)	NE	560	660	420 J+	1600	580		370	340	560	740	2200	1000	1200	460
Selenium	**0.77**	< 1.3 U	< 1.3 U	< 1.0 UJ	< 1.1 U	< 1.3 U		< 1.4 U	< 1.4 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.0 U	< 1.3 U	< 1.1 U
Silver	**2**	0.28 J	0.20 J	< 0.17 U	< 0.18 U	< 0.22 U		< 0.24 U	0.63 J	< 0.19 U	< 0.18 U	< 0.18 U	< 0.17 U	< 0.21 U	< 0.19 U
Sodium (Na)	**122.5**	100	120	66	120	98		79	100	61	44	**130**	81	110	79
Thallium	**0.14**	0.086 J	0.095 J	0.10 J	**0.15**	0.046 J		0.068 J	< 0.046 U	0.073 J	0.067 J	**0.16**	0.13 J	**0.81**	0.070 J
Vanadium	46.28	17	15	19 J-	19	13		6.3	6.4	22	9.3	26	18	16	17
Zinc	**46**	32	26	14	16	36		11	24	12	17	25	15	15	21

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
R - Rejected.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-EFO	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H15
	Location ID	034-SB01	034-SS02	034-SS03	034-SS04	034-SS05	EFO-SB01	H1-SS01	H1-SS02	H11-SB02	H12-SB01	H14-SB01	H14-SB02	H14-SB03	H15-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
PCBs															
Aroclor 1016	0.41	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1221	0.2	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1232	0.17	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1242	0.041	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1248	0.0072	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1254	0.041	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1260	0.24	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1262	0.24	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
Aroclor 1268	0.24	< 0.0091 U	< 0.0090 U	< 0.0073 U	< 0.0070 U	< 0.0089 U		< 0.0096 U	< 0.0091 U	< 0.0076 U	< 0.0075 U				
SVOCs															
1,2,4-Trichlorobenzene	0.27							< 0.024 U	< 0.023 U						
1,2-Dichlorobenzene	0.09							< 0.024 U	< 0.023 U						
1,3-Dichlorobenzene	0.08							< 0.024 U	< 0.023 U						
1,4-Dichlorobenzene	0.88							< 0.024 U	< 0.023 U						
1-Methylnaphthalene	18	0.0045	0.0051	0.0023	0.0027	0.00099		< 0.00096 U	< 0.00092 U	0.0027	0.030	< 0.00073 U	< 0.00072 U	< 0.00085 U	0.0024 J-
2,4,5-Trichlorophenol	4							< 0.048 U	< 0.046 U						
2,4,6-Trichlorophenol	6.3							< 0.048 U	< 0.046 U						
2,4-Dichlorophenol	0.05							< 0.12 U	< 0.11 U						
2,4-Dimethylphenol	0.04							< 0.12 U	< 0.11 U						
2,4-Dinitrophenol	0.15							< 0.24 U	< 0.23 U						
2,4-Dinitrotoluene	1.7							< 0.024 U	< 0.023 U						
2,6-Dinitrotoluene	0.36							< 0.024 U	< 0.023 U						
2-Chloronaphthalene	480							< 0.024 U	< 0.023 U						
2-Chlorophenol	0.06							< 0.12 U	< 0.11 U						
2-Methylnaphthalene	16	0.0056	0.0049	0.0023	0.0031	0.0013		< 0.00096 U	< 0.00092 U	0.0013	0.041	< 0.00073 U	< 0.00072 U	< 0.00085 U	0.0026 J-
2-Methylphenol	0.1							< 0.12 U	< 0.11 U						
2-Nitroaniline	5.4							< 0.024 U	< 0.023 U						
2-Nitrophenol	13							< 0.12 U	< 0.11 U						
3,3-Dichlorobenzidine	0.03							< 0.96 U	< 0.92 U						
3,4-Methylphenol	NE							< 0.12 U	< 0.11 U						
3-Nitroaniline	63							< 0.024 U	< 0.023 U						
4,6-Dinitro-2-methylphenol	0.51							< 0.12 U	< 0.11 U						
4-Bromophenyl-phenylether	NE							< 0.12 U	< 0.11 U						
4-Chloro-3-methylphenol	630							< 0.048 U	< 0.046 U						
4-Chloroaniline	1							< 0.12 U	< 0.11 U						
4-Chlorophenyl-phenylether	NE							< 0.024 U	< 0.023 U						
4-Nitroaniline	25							< 0.12 U	< 0.11 U						
4-Nitrophenol	7							< 0.48 U	< 0.46 U						

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Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-EFO	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H15
	Location ID	034-SB01	034-SS02	034-SS03	034-SS04	034-SS05	EFO-SB01	H1-SS01	H1-SS02	H11-SB02	H12-SB01	H14-SB01	H14-SB02	H14-SB03	H15-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Acenaphthene	20	0.0092	0.029	0.0031	0.014	0.0025		< 0.00096 U	< 0.00092 U	0.0033	0.0080	< 0.00073 U	0.00075	< 0.00085 U	< 0.00076 UJ
Acenaphthylene	29	0.0072	0.0085	0.00095	0.0022	0.0013		< 0.00096 U	< 0.00092 U	0.0017	0.0055	< 0.00073 U	< 0.00072 U	< 0.00085 U	< 0.00076 UJ
Anthracene	6.8	0.032	0.12 J-	0.0089	0.050	0.0057		< 0.00096 U	< 0.00092 U	0.0083	0.018	< 0.00073 U	0.0011	< 0.00085 U	< 0.00076 UJ
Benzo(a)anthracene	**0.8**	0.25	0.57 J-	0.058 J+	0.15	0.040		0.0031	0.0013 J+	0.022	0.17	< 0.00073 U	0.0058	0.0012	0.0039 J-
Benzo(a)pyrene	**0.247**	**0.26**	**0.45 J-**	0.050	0.11	0.029		0.0028	**0.56**	0.021	0.12	< 0.00073 U	0.0051	0.0011	0.0041 J-
Benzo(b)fluoranthene	**1**	0.39	0.64 J-	0.076 J-	0.18	0.055		0.0072	< 0.00092 U	0.032	0.27	< 0.00073 U	0.0080	0.0023	0.0062 J-
Benzo(g,h,i)perylene	18	0.18	0.0086	0.029	0.068	0.012		0.0025	0.0018 J+	0.0088	0.074 J+	< 0.00073 U	0.0026	< 0.00085 U	0.0028 J-
Benzo(k)fluoranthene	**1**	0.11	0.23 J-	0.025 J-	0.041	0.011		0.0018	< 0.00092 U	0.0091	0.046	< 0.00073 U	0.0031	< 0.00085 U	0.0029 J-
Benzoic acid	25000							0.30 J	0.28 J						
Benzyl Alcohol	630							< 0.024 U	< 0.023 U						
Bis(2-chloro-1-methylethyl) ether	310							< 0.024 U	< 0.023 U						
Bis(2-chloroethoxy)methane	19							< 0.024 U	< 0.023 U						
Bis(2-chloroethyl)ether	0.23							< 0.048 U	< 0.046 U						
Bis(2-ethylhexyl)phthalate	0.02							< 0.048 U	< 0.046 U						
Butyl benzyl phthalate	0.59							< 0.048 U	< 0.046 U						
CARBAZOLE	240							< 0.024 U	< 0.023 U						
Chrysene	**1**	0.23	0.44 J-	0.055	0.12	0.025		0.0035	0.0013 J+	0.019	0.11	< 0.00073 U	0.0055	0.0011	0.0045 J-
Dibenz(a,h)anthracene	**0.115**	0.044	0.024 J-	0.0053	0.017	0.0034		< 0.00096 U	< 0.00092 U	0.0031	0.0095	< 0.00073 U	< 0.00072 U	< 0.00085 U	< 0.00076 UJ
Dibenzofuran	**0.15**							< 0.024 U	< 0.023 U						
Diethyl phthalate	0.23							< 0.024 U	< 0.023 U						
Dimethyl phthalate	38							< 0.024 U	< 0.023 U						
Di-n-butyl phthalate	0.011							< 0.048 U	< 0.046 U						
Di-n-octyl phthalate	0.21							< 0.024 U	< 0.023 U						
Fluoranthene	**10**	0.43	1.1 J-	0.13 J+	0.31	0.072		0.0091	0.0031 J+	0.050	0.25	< 0.00073 U	0.014	0.0027	0.0092 J-
Fluorene	30	0.011	0.035	0.0035	0.017	0.0028		< 0.00096 U	< 0.00092 U	0.0033	0.0074	< 0.00073 U	0.00076	< 0.00085 U	< 0.00076 UJ
Hexachlorobenzene	0.079							< 0.024 U	< 0.023 U						
Hexachlorobutadiene	0.1							< 0.024 U	< 0.023 U						
Hexachloroethane	0.024							< 0.024 U	< 0.023 U						
Indeno(1,2,3-cd)pyrene	**0.5**	0.20	0.27 J-	0.024	0.079	0.0098		0.0025	0.0018 J+	0.0092	0.062	< 0.00073 U	0.0026	< 0.00085 U	0.0028 J-
Isophorone	570							< 0.024 U	< 0.023 U						
Naphthalene	1	0.0058	0.0056	0.0022	0.0027	0.0014		< 0.00096 U	< 0.00092 U	0.0043	0.026	< 0.00073 U	0.00074	< 0.00085 U	0.0020 J-
Nitrobenzene	4.9							< 0.024 U	< 0.023 U						
n-Nitrosodimethylamine	0.002							< 0.024 U	< 0.023 U						
n-Nitroso-di-n-propylamine	0.078							< 0.024 U	< 0.023 U						
n-Nitrosodiphenylamine	20							< 0.024 U	< 0.023 U						
Pentachlorophenol	0.8							< 0.12 U	< 0.11 U						
Phenanthrene	**5.5**	0.13	0.48 J-	0.052 J+	0.15	0.037		0.0046	0.0014 J+	0.023	0.15	< 0.00073 U	0.0080	0.0017	0.0042 J-
Phenol	30							< 0.12 U	< 0.11 U						
Pyrene	**10**	0.37	0.90 J-	0.10 J+	0.24	0.062		0.0074	0.0024 J+	0.032	0.25	< 0.00073 U	0.011	0.0022	0.0078 J-
Total BaP PAHs Calculated	**0.493**	0.389	**0.625**	0.0714	0.168	0.0430		0.00506	**0.561**	0.0305	0.180	0.00169	0.00750	0.00239	0.00618
Total HMW PAHs Calculated	**1.791**	**1.9**	**3.3**	0.40	0.96	0.24		0.030	0.57	0.15	1.1	< 0.00073 U	0.041	0.010	0.033
Total LMW PAHs Calculated	**3.8**	0.64	1.8	0.21	0.55	0.12		0.020	0.011	0.098	0.54	< 0.00073 U	0.028	0.010	0.023

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-EFO	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H15
	Location ID	034-SB01	034-SS02	034-SS03	034-SS04	034-SS05	EFO-SB01	H1-SS01	H1-SS02	H11-SB02	H12-SB01	H14-SB01	H14-SB02	H14-SB03	H15-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [1] (mg/kg)**														
VOCs															
1,1,1,2-Tetrachloroethane	0.07							< 0.12 UJ	< 0.082 UJ		< 0.00051 U				
1,1,1-Trichloroethane	0.04							< 0.12 U	< 0.082 U		< 0.00051 U				
1,1,2,2-Tetrachloroethane	0.19							< 0.12 U	< 0.082 U		< 0.00051 U				
1,1,2-Trichloroethane	0.15							< 0.12 U	< 0.082 U		< 0.00051 U				
1,1-Dichloroethane	0.14							< 0.12 U	< 0.082 U		< 0.00051 U				
1,1-Dichloroethene	0.04							< 0.12 U	< 0.082 U		< 0.00051 U				
1,2,3-Trichloropropane	0.0051							< 0.12 U	< 0.082 U		< 0.00051 U				
1,2,4-Trimethylbenzene	0.09														
1,2-Dibromo-3-chloropropane	0.0053							< 0.20 U	< 0.14 U		< 0.0017 U				
1,2-Dibromoethane	0.036							< 0.12 U	< 0.082 U		< 0.00051 U				
1,2-Dichloroethane	0.4							< 0.12 U	< 0.082 U		< 0.00051 U				
1,2-Dichloropropane	1							< 0.12 U	< 0.082 U		< 0.00051 U				
1,3,5-Trimethylbenzene	0.16														
2-Butanone	100							< 1.0 U	< 0.68 U		0.011 J				
2-Hexanone	20							< 0.12 U	< 0.082 U		< 0.0017 U				
4-Isopropyltoluene	0.18														
Acetone	100							0.60 J	0.31 J		0.15 J+				
Benzene	0.12							< 0.12 U	< 0.082 U		< 0.00051 U				
Bromodichloromethane	0.29							< 0.12 UJ	< 0.082 UJ		< 0.00051 U				
Bromoform	0.07							< 0.12 U	< 0.082 U		< 0.00051 UJ				
Carbon disulfide	77							< 0.12 U	< 0.082 U		< 0.00051 U				
Carbon tetrachloride	0.05							< 0.12 U	< 0.082 U		< 0.00051 U				
Chlorobenzene	28							< 0.12 U	< 0.082 U		< 0.00051 U				
Chloroethane	1400							< 0.82 UJ	< 0.54 UJ		< 0.00085 U				
Chloroform	0.05							< 0.12 U	< 0.082 U		< 0.00051 U				
Chloromethane	11							< 0.12 U	< 0.082 U		< 0.00051 U				
cis-1,2-Dichloroethene	0.04							< 0.12 U	< 0.082 U		< 0.00051 U				
cis-1,3-Dichloropropene	NE							< 0.12 U	< 0.082 U		< 0.00051 U				
Dibromochloromethane	8.3							< 0.12 U	< 0.082 U		< 0.00051 U				
Dichlorodifluoromethane	8.7							< 0.12 U	< 0.082 U		< 0.00051 U				
Ethylbenzene	0.27							< 0.12 U	< 0.082 U		< 0.00051 U				
Isopropylbenzene	0.04														
Methyl tert-butyl ether	47														
Methylene chloride	2.6							< 0.12 U	< 0.082 U		< 0.0017 U				
Naphthalene	1														
n-Butylbenzene	100														
n-Propylbenzene	100														
sec-Butylbenzene	100														
Styrene	1.2							< 0.12 UJ	< 0.082 UJ		< 0.00051 U				
tert-Butylbenzene	100														
Tetrachloroethene	0.06							< 0.12 U	< 0.082 U		< 0.00051 U				

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Camp Hero Remedial Investigation
Montauk, New York

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	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Toluene	0.15							< 0.12 U	< 0.082 U		< 0.00051 U				
trans-1,2-Dichloroethene	0.04							< 0.12 U	< 0.082 U		< 0.00051 U				
trans-1,3-Dichloropropene	1.8							< 0.12 U	< 0.082 U		< 0.00051 U				
Trichloroethene	0.41							< 0.12 U	< 0.082 U		< 0.00051 U				
Trichlorofluoromethane	52							< 0.12 U	< 0.082 U		< 0.00051 U				
Vinyl Acetate	91							< 0.12 U	< 0.082 U		< 0.00051 U				
Vinyl chloride	0.059							< 0.12 U	< 0.082 U		< 0.00051 U				
Xylenes (total)	0.1							< 0.31 U	< 0.20 U		< 0.0015 U				

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Camp Hero Remedial Investigation
Montauk, New York

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Location ID		H15-SB02	H15-SB03	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS01	H18-SS02	H19-SS01	H19-SS02	H19-SS02	H2-SS01	H2-SS02
Sample Date		6/15/2016	6/15/2016	6/13/2016	6/9/2016	6/9/2016	6/9/2016	6/12/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
Depth Interval		0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type		N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Explosives															
1,3,5-Trinitrobenzene	10														
1,3-Dinitrobenzene	0.08														
2,4,6-Trinitrotoluene	3.6														
2,4-Dinitrotoluene	1.7														
2,6-Dinitrotoluene	0.36														
2-Amino-4,6-dinitrotoluene	14														
2-Nitrotoluene	0.19														
3-Nitrotoluene	0.63														
4-Amino-2,6-Dinitro Toluene	12														
4-Nitrotoluene	0.14														
Hexahydro-1,3,5-trinitro-1,3,5-triazine	2.3														
Methyl-2,4,6-trinitrophenylnitramine	1.5														
Nitrobenzene	4.9														
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	16														
Metals															
Aluminum	27822	12000	9800	14000	11000	10000	12000	4900	5900	5300	7200	11000	11000	6900	10000
Antimony	**5.6**	**6.6**	1.6	4.1	2.4	1.6	3.3	1.5	1.9	1.9	1.4	2.5	3.3	3.5	4.1
Arsenic	**3.383**	2.5	1.5	2.3	2.9	2.3	2.8	1.4	2.0	2.0	1.4 J	2.2	2.2	1.1 J	2.5
Barium	330	31	13	34	22	20	22	13	12	12	15	18	24	30	37
Beryllium	**10**	0.17 J	0.11 J	0.23	0.051 J	0.056 J	0.10 J	< 0.036 U	< 0.035 U	0.22	0.051 J	0.021 J	0.083 J	0.083 J	0.14 J
Cadmium	**0.36**	0.049 J	0.038 J	0.13 J	0.034 J	0.082 J	< 0.038 U	< 0.036 UJ	0.033 J	0.31	0.026 J	0.041 J	0.055 J	0.13 J	0.16 J
Calcium (Ca)	**751.8**	410	330	**1200**	510	380	460	**790**	**870**	730	420	560	560	470	650
Chromium	33.92	14	8.1	18	13	12	16	6.7	8.0	7.8	9.2	15	16	12	16
Cobalt	**4.85**	**6.5**	1.6	4.0	2.3	1.5	3.3	1.7	2.1	2.0	1.5	2.5	3.4	3.5	4.2
Copper	57.2	35	22	38	27	25	29	15	18	22	19	27	31	34	45
Iron (Fe)	19000	14000	10000	12000	12000	12000	12000	6000	7500	7100	8600	12000	14000	11000	13000
Lead	**11**	5.2	6.2	**20**	5.5	6.2	5.2	2.7 J	9.2 J	3.8	6.8	10	**12**	6.4	**16**
Magnesium (Mg)	**3186**	2200	700	2600	1200	840	1300	1000	1000	1100	960	1700	1800	1700	2600
Manganese (Mn)	**180**	**400**	77	**240**	140	100	140	100	130	100	87	100	150	170	**230**
Nickel	30	9.4	3.7	10	5.8	4.2	8.3	3.2 J	3.8	12	4.6	7.5	9.4	7.0	9.7
Potassium (K)	NE	1100	420	1200	540	420	520	610	570	580	310	450	490	1200	1600
Selenium	**0.77**	< 1.1 U	< 1.1 U	< 1.3 U	< 1.1 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.0 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.1 U
Silver	**2**	< 0.18 U	< 0.18 U	< 0.22 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.17 U	0.17 J	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U
Sodium (Na)	**122.5**	71	48	**130**	63	64	53	71	72	100	73	88	97	68	81
Thallium	**0.14**	**0.16**	0.065 J	0.13 J	0.081 J	0.089 J	0.082 J	0.035 J	0.050 J	**0.36**	0.058 J	0.097 J	0.077 J	0.082 J	0.12 J
Vanadium	46.28	22	16	24	20	20	21	9.6	12	11	13	19	21	18	21
Zinc	**46**	17	13	31	16	27	19	8.5	11	14	13	16	19	**210**	**100**

Notes:
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SVOC - Semivolatile Organic Compound.
R - Rejected.
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VOC - Volatile Organic Compound.
1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H15	CH-AOC-H15	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H17	CH-AOC-H18	CH-AOC-H18	CH-AOC-H18	CH-AOC-H19	CH-AOC-H19	CH-AOC-H19	CH-AOC-H2	CH-AOC-H2
	Location ID	H15-SB02	H15-SB03	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS01	H18-SS02	H19-SS01	H19-SS02	H19-SS02	H2-SS01	H2-SS02
	Sample Date	6/15/2016	6/15/2016	6/13/2016	6/9/2016	6/9/2016	6/9/2016	6/12/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
PCBs															
Aroclor 1016	0.41			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1221	0.2			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1232	0.17			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1242	0.041			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1248	0.0072			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1254	0.041			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1260	0.24			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1262	0.24			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
Aroclor 1268	0.24			< 0.0089 U	< 0.0076 U	< 0.0078 U	< 0.0077 U	< 0.0072 UJ	< 0.0071 U	< 0.0072 U				< 0.0073 UJ	< 0.0075 U
SVOCs															
1,2,4-Trichlorobenzene	0.27			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
1,2-Dichlorobenzene	0.09			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
1,3-Dichlorobenzene	0.08			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
1,4-Dichlorobenzene	0.88			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
1-Methylnaphthalene	18	0.0032	0.0048	< 0.18 U	0.00087	0.0016 J-	0.0016	0.012 J	0.0063 J	0.0058 J+	< 0.00077 U	< 0.0023 U	< 0.0023 U	0.00078 J+	0.0024 J+
2,4,5-Trichlorophenol	4			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
2,4,6-Trichlorophenol	6.3			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
2,4-Dichlorophenol	0.05			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
2,4-Dimethylphenol	0.04			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
2,4-Dinitrophenol	0.15			< 2.2 UJ	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U				< 0.18 U	< 0.19 U
2,4-Dinitrotoluene	1.7			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
2,6-Dinitrotoluene	0.36			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
2-Chloronaphthalene	480			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
2-Chlorophenol	0.06			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
2-Methylnaphthalene	16	0.0036	0.0054	< 0.18 U	0.0014	0.0027 J-	0.0028	0.014 J	0.0060 J	0.0068	0.00079	< 0.0023 U	< 0.0023 U	0.0011	0.0034
2-Methylphenol	0.1			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
2-Nitroaniline	5.4			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
2-Nitrophenol	13			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
3,3-Dichlorobenzidine	0.03			< 8.8 UJ	< 0.75 U	< 0.77 U	< 0.76 U	< 0.71 UJ	< 0.71 UJ	< 0.71 UJ				< 0.72 U	< 0.75 U
3,4-Methylphenol	NE			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
3-Nitroaniline	63			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
4,6-Dinitro-2-methylphenol	0.51			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
4-Bromophenyl-phenylether	NE			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
4-Chloro-3-methylphenol	630			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
4-Chloroaniline	1			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
4-Chlorophenyl-phenylether	NE			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
4-Nitroaniline	25			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
4-Nitrophenol	7			< 4.4 UJ	< 0.38 U	< 0.39 U	< 0.38 U	< 0.36 U	< 0.35 U	< 0.36 U				< 0.36 U	< 0.37 U

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	Location ID	H15-SB02	H15-SB03	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS01	H18-SS02	H19-SS01	H19-SS02	H19-SS02	H2-SS01	H2-SS02
	Sample Date	6/15/2016	6/15/2016	6/13/2016	6/9/2016	6/9/2016	6/9/2016	6/12/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Chemical	**Surface Criteria (1) (mg/kg)**														
Acenaphthene	20	< 0.00074 U	< 0.00074 U	0.42	0.0018	0.00079 J-	0.0011	0.024	0.015 J	0.0035	0.0017	< 0.0023 U	< 0.0023 U	< 0.00074 U	0.0032
Acenaphthylene	29	< 0.00074 U	< 0.00074 U	< 0.18 U	0.00076	0.0013 J-	< 0.00078 U	0.0035	0.0023 J+	0.00076	0.0012	< 0.0023 U	< 0.0023 U	< 0.00074 U	0.0029
Anthracene	6.8	< 0.00074 U	< 0.00074 U	1.2	0.0046	0.010 J-	0.0018	0.047	0.035 J	0.0056	0.0047	0.0025	0.0023	0.00090	0.012
Benzo(a)anthracene	**0.8**	0.0040	0.0040	**7.3**	0.025	0.0098 J	0.0089 J+	0.15	0.12 J	0.026	0.027	0.019	0.017	0.0064	0.085
Benzo(a)pyrene	**0.247**	0.0044	0.0042	**7.0**	0.011	0.0077 J-	0.0079	0.13	0.10 J	0.022	0.025	0.019	0.018	0.0057	0.24
Benzo(b)fluoranthene	**1**	0.0068	0.0069	**12 J-**	0.025	0.018 J-	0.011	0.18	0.14 J	0.030	0.037	0.033	0.026	0.0093	0.36
Benzo(g,h,i)perylene	18	0.0023	< 0.00074 U	2.5	0.0085	< 0.00078 UJ	0.0057	0.0012 J	0.055 J	0.011	0.0015	< 0.0023 U	< 0.0023 U	< 0.00074 U	0.17
Benzo(k)fluoranthene	**1**	0.0031	0.0030	**4.6**	0.0089	0.0033 J-	0.0053	0.095	0.065 J	0.0084	0.016	0.0094	0.014	0.0035	0.10
Benzoic acid	25000			< 4.4 UJ	< 0.38 U	0.70 J	< 0.38 U	< 0.36 U	< 0.35 U	< 0.36 U				< 0.36 UJ	< 0.37 UJ
Benzyl Alcohol	630			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Bis(2-chloro-1-methylethyl) ether	310			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Bis(2-chloroethoxy)methane	19			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Bis(2-chloroethyl)ether	0.23			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
Bis(2-ethylhexyl)phthalate	0.02			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
Butyl benzyl phthalate	0.59			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
CARBAZOLE	240			0.89 J	< 0.019 U	< 0.019 U	< 0.019 U	0.016 J	0.018 J	< 0.018 U				< 0.018 U	< 0.019 U
Chrysene	**1**	0.0047	0.0047	**7.4**	0.014	0.0079 J-	0.0081	0.16	0.12 J	0.024	0.028	0.020	0.019	0.0059	0.11
Dibenz(a,h)anthracene	**0.115**	< 0.00074 U	< 0.00074 U	**0.26**	0.00097	< 0.00078 UJ	< 0.00078 U	0.013	0.017 J	0.0022	0.00089	< 0.0023 U	< 0.0023 U	< 0.00074 U	< 0.015 U
Dibenzofuran	**0.15**			**0.16 J**	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Diethyl phthalate	0.23			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Dimethyl phthalate	38			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Di-n-butyl phthalate	0.011			< 0.44 UJ	< 0.038 U	< 0.039 U	< 0.038 U	< 0.036 U	< 0.035 U	< 0.036 U				< 0.036 U	< 0.037 U
Di-n-octyl phthalate	0.21			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Fluoranthene	**10**	0.010	0.0098	**18 J-**	0.035	0.016 J-	0.020	0.42	0.30 J	0.058	0.063	0.046	0.042	0.012	0.036
Fluorene	30	< 0.00074 U	< 0.00074 U	0.48	0.0017	0.0011 J	0.00092 J+	0.031 J	0.018 J	0.0036	0.0020	< 0.0023 U	< 0.0023 U	< 0.00074 U	0.0036
Hexachlorobenzene	0.079			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Hexachlorobutadiene	0.1			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Hexachloroethane	0.024			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Indeno(1,2,3-cd)pyrene	**0.5**	0.0023	< 0.00074 U	**2.5**	0.0080	< 0.00078 UJ	0.0061	0.085	0.066 J	0.014	< 0.00077 U	< 0.0023 U	< 0.0023 U	0.0041	0.17
Isophorone	570			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Naphthalene	1	0.0023	0.0039	< 0.18 U	0.0061	0.0030 J-	0.0032	0.020 J	0.0053 J	0.0050	0.00093	< 0.0023 U	< 0.0023 U	0.00089	0.0039
Nitrobenzene	4.9			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
n-Nitrosodimethylamine	0.002			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
n-Nitroso-di-n-propylamine	0.078			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
n-Nitrosodiphenylamine	20			< 0.22 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.018 U	< 0.018 U				< 0.018 U	< 0.019 U
Pentachlorophenol	0.8			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
Phenanthrene	**5.5**	0.0045	0.0049	**5.8**	0.026	0.012 J	0.0089 J+	0.29	0.18 J	0.035	0.029	0.020	0.019	0.0052	0.027
Phenol	30			< 1.1 UJ	< 0.094 U	< 0.096 U	< 0.095 U	< 0.089 U	< 0.088 U	< 0.089 U				< 0.089 U	< 0.093 U
Pyrene	**10**	0.0088	0.0082	**15 J-**	0.035	0.018 J-	0.016	0.32	0.23 J	0.043	0.049	0.039	0.036	0.010	0.064
Total BaP PAHs Calculated	**0.493**	0.00649	0.00614	**9.49**	0.0179	0.0114	0.0113	0.186	0.150	0.0313	0.0326	0.0268	0.0250	0.00846	0.318
Total HMW PAHs Calculated	**1.791**	0.034	0.030	**54**	0.13	0.064	0.064	1.0	0.85	0.17	0.17	0.14	0.12	0.043	1.2
Total LMW PAHs Calculated	**3.8**	0.027	0.032	**27**	0.078	0.048	0.041	0.86	0.57	0.12	0.10	0.082	0.077	0.023	0.094

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H15	CH-AOC-H15	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H17	CH-AOC-H18	CH-AOC-H18	CH-AOC-H18	CH-AOC-H19	CH-AOC-H19	CH-AOC-H19	CH-AOC-H2	CH-AOC-H2
	Location ID	H15-SB02	H15-SB03	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS01	H18-SS02	H19-SS01	H19-SS02	H19-SS02	H2-SS01	H2-SS02
	Sample Date	6/15/2016	6/15/2016	6/13/2016	6/9/2016	6/9/2016	6/9/2016	6/12/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
VOCs															
1,1,1,2-Tetrachloroethane	0.07			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 UJ	< 0.086 UJ	< 0.078 UJ	< 0.060 UJ	< 0.066 UJ
1,1,1-Trichloroethane	0.04			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,1,2,2-Tetrachloroethane	0.19			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,1,2-Trichloroethane	0.15			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,1-Dichloroethane	0.14			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,1-Dichloroethene	0.04			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,2,3-Trichloropropane	0.0051			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,2,4-Trimethylbenzene	0.09														
1,2-Dibromo-3-chloropropane	0.0053			< 0.0026 UJ	< 0.16 U	< 0.17 U	< 0.12 U	< 0.0022 U	< 0.0023 U	< 0.0022 U	< 0.13 U	< 0.14 U	< 0.13 U	< 0.10 U	< 0.11 U
1,2-Dibromoethane	0.036			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,2-Dichloroethane	0.4			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,2-Dichloropropane	1			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
1,3,5-Trimethylbenzene	0.16														
2-Butanone	100			< 0.013 UJ	< 0.80 U	< 0.84 U	< 0.60 U	< 0.011 U	< 0.012 U	< 0.011 U	< 0.65 U	< 0.72 U	< 0.65 U	< 0.50 U	< 0.55 U
2-Hexanone	20			< 0.0026 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.0022 U	< 0.0023 U	< 0.0022 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
4-Isopropyltoluene	0.18														
Acetone	100			< 0.0026 UJ	< 0.64 U	< 0.67 U	< 0.48 U	< 0.0022 UJ	< 0.0023 UJ	< 0.0022 UJ	0.28 J	0.23 J	0.23 J	< 0.40 U	0.073 J
Benzene	0.12			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Bromodichloromethane	0.29			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 UJ	< 0.086 UJ	< 0.078 UJ	< 0.060 UJ	< 0.066 UJ
Bromoform	0.07			< 0.00078 UJ	< 0.096 UJ	< 0.10 UJ	< 0.072 UJ	< 0.00065 UJ	< 0.00069 UJ	< 0.00065 UJ	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Carbon disulfide	77			0.0013	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Carbon tetrachloride	0.05			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Chlorobenzene	28			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Chloroethane	1400			< 0.0013 U	< 0.64 U	< 0.67 U	< 0.48 U	< 0.0011 U	< 0.0012 U	< 0.0011 U	< 0.52 UJ	< 0.58 UJ	< 0.52 UJ	< 0.40 UJ	< 0.44 UJ
Chloroform	0.05			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Chloromethane	11			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
cis-1,2-Dichloroethene	0.04			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
cis-1,3-Dichloropropene	NE			< 0.00078 UJ	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Dibromochloromethane	8.3			< 0.00078 UJ	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 UJ	< 0.00069 UJ	< 0.00065 UJ	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Dichlorodifluoromethane	8.7			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Ethylbenzene	0.27			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Isopropylbenzene	0.04														
Methyl tert-butyl ether	47														
Methylene chloride	2.6			< 0.0026 U	< 0.096 U	0.091 J	0.055 J	< 0.0022 UJ	< 0.0023 UJ	< 0.0022 U	0.061 J	0.086 J	< 0.078 UJ	< 0.060 U	< 0.066 U
Naphthalene	1														
n-Butylbenzene	100														
n-Propylbenzene	100														
sec-Butylbenzene	100														
Styrene	1.2			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 UJ	< 0.086 UJ	< 0.078 UJ	< 0.060 UJ	< 0.066 UJ
tert-Butylbenzene	100														
Tetrachloroethene	0.06			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
R - Rejected.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H15	CH-AOC-H15	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H17	CH-AOC-H18	CH-AOC-H18	CH-AOC-H18	CH-AOC-H19	CH-AOC-H19	CH-AOC-H19	CH-AOC-H2	CH-AOC-H2
	Location ID	H15-SB02	H15-SB03	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS01	H18-SS02	H19-SS01	H19-SS02	H19-SS02	H2-SS01	H2-SS02
	Sample Date	6/15/2016	6/15/2016	6/13/2016	6/9/2016	6/9/2016	6/9/2016	6/12/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Toluene	0.15			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
trans-1,2-Dichloroethene	0.04			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
trans-1,3-Dichloropropene	1.8			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Trichloroethene	0.41			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Trichlorofluoromethane	52			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Vinyl Acetate	91			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Vinyl chloride	0.059			< 0.00078 U	< 0.096 U	< 0.10 U	< 0.072 U	< 0.00065 U	< 0.00069 U	< 0.00065 U	< 0.078 U	< 0.086 U	< 0.078 U	< 0.060 U	< 0.066 U
Xylenes (total)	0.1			< 0.0024 U	< 0.24 U	< 0.25 U	< 0.18 U	< 0.0019 U	< 0.0021 U	< 0.0020 U	< 0.19 U	< 0.22 U	< 0.19 U	< 0.15 U	< 0.17 U

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	Location ID	H20-SS01	H20-SS02	H21-SB01	H21-SB02	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB01	H4-SB02	H4-SB03	H5-SS01	H5-SS02
	Sample Date	6/7/2016	6/7/2016	6/14/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Explosives															
1,3,5-Trinitrobenzene	10														
1,3-Dinitrobenzene	0.08														
2,4,6-Trinitrotoluene	3.6														
2,4-Dinitrotoluene	1.7														
2,6-Dinitrotoluene	0.36														
2-Amino-4,6-dinitrotoluene	14														
2-Nitrotoluene	0.19														
3-Nitrotoluene	0.63														
4-Amino-2,6-Dinitro Toluene	12														
4-Nitrotoluene	0.14														
Hexahydro-1,3,5-trinitro-1,3,5-triazine	2.3														
Methyl-2,4,6-trinitrophenylnitramine	1.5														
Nitrobenzene	4.9														
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	16														
Metals															
Aluminum	27822	6800	8500	8400	7100	8100	8500	8500	8200	9400				7700	8000
Antimony	**5.6**	2.5	2.5	2.3	1.7	2.2	2.9	1.3	0.91	2.3				1.5 J	**23 J**
Arsenic	**3.383**	1.2 J	1.3 J	1.4	1.1 J	1.8	1.8	1.4	1.6	1.7				2.6 J	**4.2 J**
Barium	330	33	37	22	12	22	21	13	12	14				54	90
Beryllium	**10**	0.85	0.50	0.062 J	0.035 J	0.11 J	0.052 J	0.029 J	< 0.039 U	1.4				1.0	**20 J**
Cadmium	**0.36**	**0.45**	0.14 J	0.038 J	0.037 J	0.099 J	< 0.035 U	< 0.036 U	0.045 J	**1.1**				**0.81**	**20 J**
Calcium (Ca)	**751.8**	**1400**	**1300**	490	430	560	360	380	390	530				490	**1100**
Chromium	33.92	14	14	9.8	8.0	11	12	9.4	9.8	10				5.0	26 J
Cobalt	**4.85**	2.5	2.6	2.5	1.9	2.3	2.9	1.4	0.89	2.4				1.4 J	**23 J**
Copper	57.2	24	30	32	22	29	24	19	26	24				13	41 J
Iron (Fe)	19000	6200	11000	11000	9500	11000	10000	8900	12000	12000				2100	1900
Lead	**11**	**27**	2.9 J	3.0 J	4.0	5.2	3.2 J	4.4	8.3	10	5.7	**47**	4.6	**20**	**37**
Magnesium (Mg)	**3186**	1300	2000	1200	750	1300	1300	700	480	500				210	460 J
Manganese (Mn)	**180**	72	110	120	84	110	140	79	69	78				13	40 J
Nickel	30	8.2	11	5.8	3.9	7.0	6.1	4.0	2.8 J	6.2				4.4 J	28 J
Potassium (K)	NE	750	1300	750	330	680	760	300	310	230				250	490 J
Selenium	**0.77**	< 1.5 U	< 1.2 U	< 1.1 U	< 1.0 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.2 U				< 3.1 U	**4.8 J**
Silver	**2**	0.28 J	< 0.21 U	< 0.18 U	< 0.17 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.20 U	0.53 J				0.58 J	**9.5 J**
Sodium (Na)	**122.5**	**130**	120	67	59	100	54	52	76	69				**210**	**500 J**
Thallium	**0.14**	0.068 J	0.079 J	0.11 J	0.051 J	0.091 J	0.092 J	0.056 J	0.054 J	0.074 J				< 0.099 U	< 0.12 U
Vanadium	46.28	12	15	17	14	18	16	13	21	22				8.6	26 J
Zinc	**46**	25	21	13	8.7	18	13	11	16	**57**				35	**150 J**

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Location ID		H20-SS01	H20-SS02	H21-SB01	H21-SB02	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB01	H4-SB02	H4-SB03	H5-SS01	H5-SS02
Sample Date		6/7/2016	6/7/2016	6/14/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016
Depth Interval		0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N	FD
Chemical	**Surface Criteria [1] (mg/kg)**														
PCBs															
Aroclor 1016	0.41	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1221	0.2	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1232	0.17	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1242	0.041	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1248	0.0072	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1254	0.041	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1260	0.24	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1262	0.24	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
Aroclor 1268	0.24	< 0.0099 U	< 0.0084 U	< 0.0072 U	< 0.0072 U	< 0.0077 U	< 0.0072 U	< 0.0075 U	< 0.0081 U	< 0.0082 U	< 0.0082 U	< 0.0080 U	< 0.0079 U	< 0.021 UJ	< 0.024 UJ
SVOCs															
1,2,4-Trichlorobenzene	0.27	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
1,2-Dichlorobenzene	0.09	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
1,3-Dichlorobenzene	0.08	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
1,4-Dichlorobenzene	0.88	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
1-Methylnaphthalene	18	0.065	< 0.0025 U	0.022 J+	0.0045 J+	0.013 J+	< 0.0022 U	< 0.0022 U	< 0.00081 U	< 0.00081 U				< 0.0021 U	< 0.036 UJ
2,4,5-Trichlorophenol	4	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 U
2,4,6-Trichlorophenol	6.3	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 U
2,4-Dichlorophenol	0.05	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
2,4-Dimethylphenol	0.04	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
2,4-Dinitrophenol	0.15	< 0.25 UJ	< 0.22 U	< 0.18 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.20 UJ	< 0.20 UJ				< 1.5 UJ	< 1.8 U
2,4-Dinitrotoluene	1.7	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
2,6-Dinitrotoluene	0.36	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
2-Chloronaphthalene	480	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
2-Chlorophenol	0.06	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
2-Methylnaphthalene	16	0.072	< 0.0025 U	0.028	0.0053	0.016 J+	< 0.0022 U	< 0.0022 U	< 0.00081 U	< 0.00081 U				< 0.0021 U	< 0.036 UJ
2-Methylphenol	0.1	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 U	< 0.89 U
2-Nitroaniline	5.4	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
2-Nitrophenol	13	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
3,3-Dichlorobenzidine	0.03	< 1.0 U	< 0.86 U	< 0.73 U	< 0.72 U	< 0.76 U	< 0.72 U	< 0.75 U	< 0.80 U	< 0.81 U				< 6.1 UJ	< 7.2 UJ
3,4-Methylphenol	NE	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 U	< 0.89 U
3-Nitroaniline	63	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
4,6-Dinitro-2-methylphenol	0.51	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
4-Bromophenyl-phenylether	NE	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 UJ
4-Chloro-3-methylphenol	630	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 U
4-Chloroaniline	1	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 U	< 0.89 U
4-Chlorophenyl-phenylether	NE	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
4-Nitroaniline	25	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 UJ
4-Nitrophenol	7	< 0.50 U	< 0.43 U	< 0.36 U	< 0.36 U	< 0.38 U	< 0.36 U	< 0.38 U	< 0.40 U	< 0.40 U				< 3.1 UJ	< 3.6 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
R - Rejected.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H20	CH-AOC-H20	CH-AOC-H21	CH-AOC-H21	CH-AOC-H21	CH-AOC-H22	CH-AOC-H22	CH-AOC-H3	CH-AOC-H3	CH-AOC-H4	CH-AOC-H4	CH-AOC-H4	CH-AOC-H5	CH-AOC-H5
	Location ID	H20-SS01	H20-SS02	H21-SB01	H21-SB02	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB01	H4-SB02	H4-SB03	H5-SS01	H5-SS02
	Sample Date	6/7/2016	6/7/2016	6/14/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
Chemical	**Surface Criteria [1] (mg/kg)**														
Acenaphthene	20	0.41	0.013	0.0028	< 0.0022 U	0.0057 J+	< 0.0022 U	< 0.0022 U	< 0.00081 U	< 0.00081 U				< 0.0021 U	< 0.036 UJ
Acenaphthylene	29	0.15	0.0058	< 0.0022 U	< 0.0022 U	0.0025 J+	< 0.0022 U	0.0030	0.0011	< 0.00081 U				0.0059	< 0.036 UJ
Anthracene	6.8	0.35	0.0074	0.0040	< 0.0022 U	0.021 J+	0.0025	0.0057	0.0018	0.00097				< 0.0021 U	< 0.036 UJ
Benzo(a)anthracene	**0.8**	**0.97**	0.061	0.025	0.0027	0.10	0.0095	0.019	0.011	0.0051				0.019	0.051
Benzo(a)pyrene	**0.247**	**0.70**	0.030	0.022	0.0022	0.074	0.0089	0.020	0.013	0.0056				0.016	0.042
Benzo(b)fluoranthene	**1**	**1.4**	0.068	0.048	0.0039	0.12	0.019	0.040	0.023	0.011				< 0.0021 U	0.11
Benzo(g,h,i)perylene	18	0.32	0.015	0.0088	< 0.0022 U	0.0042 J+	< 0.0022 U	< 0.0022 U	0.0050	0.0020				< 0.0021 U	< 0.036 UJ
Benzo(k)fluoranthene	**1**	0.34	0.021	0.010	< 0.0022 U	0.039	0.0076	0.0080	0.0065	0.0025				< 0.0021 U	< 0.036 UJ
Benzoic acid	25000	< 0.50 UJ	< 0.43 U	0.33 J	< 0.36 UJ	0.37 J	< 0.36 UJ	< 0.38 UJ	0.65 J	0.38 J				< 3.1 UJ	3.5 J
Benzyl Alcohol	630	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	0.027 J	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Bis(2-chloro-1-methylethyl) ether	310	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Bis(2-chloroethoxy)methane	19	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Bis(2-chloroethyl)ether	0.23	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 UJ
Bis(2-ethylhexyl)phthalate	0.02	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 UJ
Butyl benzyl phthalate	0.59	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 UJ
CARBAZOLE	240	0.15 J	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Chrysene	**1**	**1.1**	0.051	0.029	0.0023	0.071	0.013	0.021	0.012	0.0051				0.014	0.039
Dibenz(a,h)anthracene	**0.115**	**0.12**	0.0045	0.0027	< 0.0022 U	0.0025 J+	< 0.0022 U	< 0.0022 U	0.0015	< 0.00081 U				< 0.0021 U	< 0.036 UJ
Dibenzofuran	**0.15**	**0.16 J**	< 0.022 U	0.066 J	< 0.018 U	0.011 J	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Diethyl phthalate	0.23	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Dimethyl phthalate	38	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Di-n-butyl phthalate	0.011	< 0.050 U	< 0.043 U	< 0.036 U	< 0.036 U	< 0.038 U	< 0.036 U	< 0.038 U	< 0.040 U	< 0.040 U				< 0.31 UJ	< 0.36 UJ
Di-n-octyl phthalate	0.21	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Fluoranthene	**10**	3.1	0.26	0.053	0.0058	0.19	0.028	0.033	0.026	0.011				0.022	0.083
Fluorene	30	0.34	0.0076	0.0024	< 0.0022 U	0.0055 J+	< 0.0022 U	< 0.0022 U	0.00099	< 0.00081 U				< 0.0021 U	< 0.036 UJ
Hexachlorobenzene	0.079	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Hexachlorobutadiene	0.1	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Hexachloroethane	0.024	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Indeno(1,2,3-cd)pyrene	**0.5**	0.34	0.015	0.0088	< 0.0022 U	0.022 J+	< 0.0022 U	< 0.0022 U	0.0052	0.0024				< 0.0021 U	< 0.036 UJ
Isophorone	570	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Naphthalene	1	0.12	< 0.0025 U	0.023	0.0045	0.015 J+	< 0.0022 U	< 0.0022 U	0.00099	< 0.00081 U				0.0027	< 0.036 U
Nitrobenzene	4.9	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
n-Nitrosodimethylamine	0.002	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
n-Nitroso-di-n-propylamine	0.078	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
n-Nitrosodiphenylamine	20	< 0.025 U	< 0.022 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.018 U	< 0.019 U	< 0.020 U	< 0.020 U				< 0.15 UJ	< 0.18 UJ
Pentachlorophenol	0.8	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
Phenanthrene	**5.5**	0.62	0.047	0.035	0.0031	0.082	0.0086	0.010	0.012	0.0050				0.018	0.059 J
Phenol	30	< 0.13 U	< 0.11 U	< 0.091 U	< 0.090 U	< 0.095 U	< 0.090 U	< 0.094 U	< 0.10 U	< 0.10 U				< 0.77 UJ	< 0.89 U
Pyrene	**10**	2.5	0.20	0.043	0.0046	0.15	0.022	0.027	0.020	0.0088				0.043	0.10
Total BaP PAHs Calculated	**0.493**	**1.10**	0.0492	0.0330	0.00530	0.101	0.0143	0.0284	0.0185	0.00829				0.0205	0.0981
Total HMW PAHs Calculated	**1.791**	**7.5**	0.44	0.19	0.022	0.54	0.079	0.13	0.091	0.041				0.10	0.45
Total LMW PAHs Calculated	**3.8**	**5.2**	0.35	0.17	0.032	0.35	0.052	0.063	0.045	0.022				0.059	0.39

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1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

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Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

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	Location ID	H20-SS01	H20-SS02	H21-SB01	H21-SB02	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB01	H4-SB02	H4-SB03	H5-SS01	H5-SS02
	Sample Date	6/7/2016	6/7/2016	6/14/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
Chemical	**Surface Criteria (1) (mg/kg)**														
VOCs															
1,1,1,2-Tetrachloroethane	0.07	< 0.083 UJ	< 0.15 UJ	< 0.070 UJ	< 0.096 UJ	< 0.079 UJ	< 0.070 UJ	< 0.069 UJ	< 0.084 UJ	< 0.079 UJ				< 0.28 U	< 0.33 U
1,1,1-Trichloroethane	0.04	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,1,2,2-Tetrachloroethane	0.19	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,1,2-Trichloroethane	0.15	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,1-Dichloroethane	0.14	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,1-Dichloroethene	0.04	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,2,3-Trichloropropane	0.0051	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,2,4-Trimethylbenzene	0.09														
1,2-Dibromo-3-chloropropane	0.0053	< 0.28 U	< 0.51 U	< 0.12 U	< 0.16 U	< 0.13 U	< 0.12 U	< 0.11 U	< 0.28 U	< 0.26 U				< 0.95 U	< 1.1 U
1,2-Dibromoethane	0.036	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,2-Dichloroethane	0.4	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,2-Dichloropropane	1	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
1,3,5-Trimethylbenzene	0.16														
2-Butanone	100	< 0.69 U	< 1.3 U	< 0.58 U	< 0.80 U	< 0.66 U	< 0.58 U	< 0.57 U	< 0.70 U	< 0.66 U				< 2.4 U	< 2.7 U
2-Hexanone	20	< 0.14 U	< 0.25 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.14 U	< 0.13 U				< 0.47 U	< 0.55 U
4-Isopropyltoluene	0.18														
Acetone	100	0.24 J	0.49 J	0.14 J	0.27 J	0.23 J	0.17 J	0.27 J	0.19 J	< 0.26 U				2.4	0.78 J
Benzene	0.12	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Bromodichloromethane	0.29	< 0.083 UJ	< 0.15 UJ	< 0.070 UJ	< 0.096 UJ	< 0.079 UJ	< 0.070 UJ	< 0.069 UJ	< 0.084 UJ	< 0.079 UJ				< 0.28 U	< 0.33 U
Bromoform	0.07	< 0.083 UJ	< 0.15 UJ	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 UJ	< 0.079 UJ				< 0.28 UJ	< 0.33 UJ
Carbon disulfide	77	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Carbon tetrachloride	0.05	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Chlorobenzene	28	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Chloroethane	1400	< 0.28 U	< 0.51 U	< 0.47 UJ	< 0.64 UJ	< 0.53 UJ	< 0.46 UJ	< 0.46 UJ	< 0.28 U	< 0.26 U				< 0.95 U	< 1.1 U
Chloroform	0.05	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Chloromethane	11	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
cis-1,2-Dichloroethene	0.04	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
cis-1,3-Dichloropropene	NE	< 0.083 UJ	< 0.15 UJ	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 UJ	< 0.079 UJ				< 0.28 U	< 0.33 U
Dibromochloromethane	8.3	< 0.083 UJ	< 0.15 UJ	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 UJ	< 0.079 UJ				< 0.28 U	< 0.33 U
Dichlorodifluoromethane	8.7	< 0.28 U	< 0.51 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.28 U	< 0.26 U				< 0.95 U	< 1.1 U
Ethylbenzene	0.27	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Isopropylbenzene	0.04														
Methyl tert-butyl ether	47														
Methylene chloride	2.6	< 0.14 U	< 0.25 U	0.054 J	0.072 J	< 0.079 U	0.064 J	0.064 J	< 0.14 U	0.13 J				< 0.47 U	< 0.55 U
Naphthalene	1														
n-Butylbenzene	100														
n-Propylbenzene	100														
sec-Butylbenzene	100														
Styrene	1.2	< 0.083 UJ	< 0.15 UJ	< 0.070 UJ	< 0.096 UJ	< 0.079 UJ	< 0.070 UJ	< 0.069 UJ	< 0.084 UJ	< 0.079 UJ				< 0.28 U	< 0.33 U
tert-Butylbenzene	100														
Tetrachloroethene	0.06	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U

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Table 6
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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H20	CH-AOC-H20	CH-AOC-H21	CH-AOC-H21	CH-AOC-H21	CH-AOC-H22	CH-AOC-H22	CH-AOC-H3	CH-AOC-H3	CH-AOC-H4	CH-AOC-H4	CH-AOC-H4	CH-AOC-H5	CH-AOC-H5
	Location ID	H20-SS01	H20-SS02	H21-SB01	H21-SB02	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB01	H4-SB02	H4-SB03	H5-SS01	H5-SS02
	Sample Date	6/7/2016	6/7/2016	6/14/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
Chemical	**Surface Criteria [(1)] (mg/kg)**														
Toluene	0.15	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
trans-1,2-Dichloroethene	0.04	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
trans-1,3-Dichloropropene	1.8	< 0.083 UJ	< 0.15 UJ	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 UJ	< 0.079 UJ				< 0.28 U	< 0.33 U
Trichloroethene	0.41	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Trichlorofluoromethane	52	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Vinyl Acetate	91	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Vinyl chloride	0.059	< 0.083 U	< 0.15 U	< 0.070 U	< 0.096 U	< 0.079 U	< 0.070 U	< 0.069 U	< 0.084 U	< 0.079 U				< 0.28 U	< 0.33 U
Xylenes (total)	0.1	< 0.25 U	< 0.46 U	< 0.18 U	< 0.24 U	< 0.20 U	< 0.17 U	< 0.17 U	< 0.25 U	< 0.24 U				< 0.85 U	< 0.99 U

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Camp Hero Remedial Investigation
Montauk, New York

Chemical	Surface Criteria [(1)] (mg/kg)	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5	CH-AOC-H6	CH-AOC-H6	CH-AOC-H6	CH-AOC-H9	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	H5-SS02	H5-SS03	H5-SS04	H6-SB01	H6-SB02	H6-SB03	H9-SS01	P113-SB02	P113-SB03	WDS-SB01	WDS-SB04	WDS-SB05
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/12/2016	6/12/2016	6/12/2016	6/6/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N
Explosives													
1,3,5-Trinitrobenzene	10												
1,3-Dinitrobenzene	0.08												
2,4,6-Trinitrotoluene	3.6												
2,4-Dinitrotoluene	1.7												
2,6-Dinitrotoluene	0.36												
2-Amino-4,6-dinitrotoluene	14												
2-Nitrotoluene	0.19												
3-Nitrotoluene	0.63												
4-Amino-2,6-Dinitro Toluene	12												
4-Nitrotoluene	0.14												
Hexahydro-1,3,5-trinitro-1,3,5-triazine	2.3												
Methyl-2,4,6-trinitrophenylnitramine	1.5												
Nitrobenzene	4.9												
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	16												
Metals													
Aluminum	27822	8100						12000			12000	8200	8200
Antimony	**5.6**	1.1 J						4.4			4.5	2.4	2.4
Arsenic	**3.383**	2.7 J						2.8			2.7	1.7	1.6
Barium	330	86						29			47	30	25
Beryllium	**10**	0.43 J						0.46			0.14 J	0.12 J	0.069 J
Cadmium	**0.36**	**0.53 J**						0.043 J			0.096 J	0.050 J	0.13 J
Calcium (Ca)	**751.8**	**800**						600			**1100**	470	420
Chromium	33.92	5.0 J						15			17	12	13
Cobalt	**4.85**	0.90 J						4.6			4.6	2.5	2.4
Copper	57.2	18 J						40			39	27	26
Iron (Fe)	19000	2200						19000			14000	11000	9600
Lead	**11**	**27**	**18**	7.7 J	**15**	3.0 J	7.5 J	4.8	4.3	7.4	**16**	3.9	6.0
Magnesium (Mg)	**3186**	230 J						1600			3100	1500	1100
Manganese (Mn)	**180**	20 J						**440**			**260**	130	120
Nickel	30	4.3 J						9.1			10	6.6	7.7
Potassium (K)	NE	260 J						990			1800	870	590
Selenium	**0.77**	< 3.7 UJ						< 1.3 U			< 1.2 U	< 1.1 U	< 1.1 U
Silver	**2**	0.23 J						< 0.21 U			< 0.20 U	< 0.19 U	0.10 J
Sodium (Na)	**122.5**	**220 J**						66			**160**	72	70
Thallium	**0.14**	< 0.12 U						0.060 J			0.12 J	0.11 J	0.085 J
Vanadium	46.28	9.5 J						26			24	18	16
Zinc	**46**	**50 J**						20			37	17	24

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Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Location Group		CH-AOC-H5	CH-AOC-H5	CH-AOC-H5	CH-AOC-H6	CH-AOC-H6	CH-AOC-H6	CH-AOC-H9	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID		H5-SS02	H5-SS03	H5-SS04	H6-SB01	H6-SB02	H6-SB03	H9-SS01	P113-SB02	P113-SB03	WDS-SB01	WDS-SB04	WDS-SB05
Sample Date		6/13/2016	6/13/2016	6/13/2016	6/12/2016	6/12/2016	6/12/2016	6/6/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016
Depth Interval		0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**												
PCBs													
Aroclor 1016	0.41	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1221	0.2	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1232	0.17	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1242	0.041	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1248	0.0072	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1254	0.041	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1260	0.24	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1262	0.24	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
Aroclor 1268	0.24	< 0.024 UJ	< 0.028 UJ	< 0.041 U	< 0.020 UJ	< 0.0083 U	< 0.030 UJ				< 0.0083 U	< 0.0074 U	< 0.0074 U
SVOCs													
1,2,4-Trichlorobenzene	0.27	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
1,2-Dichlorobenzene	0.09	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
1,3-Dichlorobenzene	0.08	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
1,4-Dichlorobenzene	0.88	< 0.89 UJ									< 0.31 U	< 0.019 U	0.013 J
1-Methylnaphthalene	18	0.0043 J						< 0.017 U			0.0084	0.0012 J+	0.0045 J+
2,4,5-Trichlorophenol	4	< 1.8 UJ									< 0.62 UJ	< 0.037 U	< 0.037 U
2,4,6-Trichlorophenol	6.3	< 1.8 UJ									< 0.62 UJ	< 0.037 U	< 0.037 U
2,4-Dichlorophenol	0.05	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
2,4-Dimethylphenol	0.04	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
2,4-Dinitrophenol	0.15	< 8.9 UJ									< 3.1 UJ	< 0.19 U	< 0.19 U
2,4-Dinitrotoluene	1.7	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
2,6-Dinitrotoluene	0.36	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
2-Chloronaphthalene	480	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
2-Chlorophenol	0.06	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
2-Methylnaphthalene	16	0.0041 J						< 0.017 U			0.0066	0.0016 J+	0.0062 J+
2-Methylphenol	0.1	< 4.4 U									< 1.5 U	< 0.093 U	< 0.093 U
2-Nitroaniline	5.4	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
2-Nitrophenol	13	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
3,3-Dichlorobenzidine	0.03	< 35 UJ									< 12 U	< 0.74 U	< 0.74 U
3,4-Methylphenol	NE	< 4.4 U									< 1.5 U	< 0.093 U	< 0.093 U
3-Nitroaniline	63	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
4,6-Dinitro-2-methylphenol	0.51	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
4-Bromophenyl-phenylether	NE	< 4.4 UJ									< 1.5 U	< 0.093 U	< 0.093 U
4-Chloro-3-methylphenol	630	< 1.8 UJ									< 0.62 UJ	< 0.037 U	< 0.037 U
4-Chloroaniline	1	< 4.4 U									< 1.5 U	< 0.093 U	< 0.093 U
4-Chlorophenyl-phenylether	NE	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
4-Nitroaniline	25	< 4.4 UJ									< 1.5 U	< 0.093 U	< 0.093 U
4-Nitrophenol	7	< 18 UJ									< 6.2 UJ	< 0.37 U	< 0.37 U

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	Location ID	H5-SS02	H5-SS03	H5-SS04	H6-SB01	H6-SB02	H6-SB03	H9-SS01	P113-SB02	P113-SB03	WDS-SB01	WDS-SB04	WDS-SB05
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/12/2016	6/12/2016	6/12/2016	6/6/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**												
Acenaphthene	20	0.0030 J						0.018	< 0.00079 U	< 0.00093 U	0.037	0.00089 J+	0.013 J+
Acenaphthylene	29	0.0070 J						< 0.017 U	0.0015	< 0.00093 U	0.018	0.0066 J+	0.0074 J+
Anthracene	6.8	0.0098 J						0.079	0.0012	< 0.00093 U	0.095	0.0075 J+	0.056
Benzo(a)anthracene	**0.8**	0.047						0.24	0.0047	0.0029	0.27	0.017	0.24
Benzo(a)pyrene	**0.247**	0.037						0.18	0.0037	0.0030	**0.26**	0.019	0.18
Benzo(b)fluoranthene	**1**	0.092						0.25	0.0097	0.010	0.39	0.064	0.32
Benzo(g,h,i)perylene	18	0.018 J						0.10	0.0023	< 0.00093 U	0.018	< 0.00075 U	< 0.015 U
Benzo(k)fluoranthene	**1**	0.019 J						0.095	0.0016	0.0014	0.14	0.023	0.13
Benzoic acid	25000	< 18 UJ									< 6.2 UJ	0.18 J	0.20 J
Benzyl Alcohol	630	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Bis(2-chloro-1-methylethyl) ether	310	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Bis(2-chloroethoxy)methane	19	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Bis(2-chloroethyl)ether	0.23	< 1.8 UJ									< 0.62 U	< 0.037 U	< 0.037 U
Bis(2-ethylhexyl)phthalate	0.02	< 1.8 UJ									< 0.62 U	< 0.037 U	< 0.037 U
Butyl benzyl phthalate	0.59	< 1.8 UJ									< 0.62 U	< 0.037 U	< 0.037 U
CARBAZOLE	240	< 0.89 UJ									< 0.31 U	< 0.019 U	0.016 J
Chrysene	**1**	0.037						0.17	0.0032	0.0032	0.24	0.044	0.20
Dibenz(a,h)anthracene	**0.115**	0.0028 J						0.037	< 0.00079 U	< 0.00093 U	0.0087	< 0.00075 U	0.013 J+
Dibenzofuran	**0.15**	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Diethyl phthalate	0.23	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Dimethyl phthalate	38	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Di-n-butyl phthalate	0.011	< 1.8 UJ									< 0.62 U	< 0.037 U	< 0.037 U
Di-n-octyl phthalate	0.21	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Fluoranthene	**10**	0.076						0.52	0.0061	0.0044	0.53	0.10	0.46
Fluorene	30	0.0052 J						0.023	< 0.00079 U	< 0.00093 U	0.038	0.0014 J+	0.014 J+
Hexachlorobenzene	0.079	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Hexachlorobutadiene	0.1	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Hexachloroethane	0.024	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Indeno(1,2,3-cd)pyrene	**0.5**	0.015 J						0.10	0.0019	< 0.00093 U	0.10	0.0085 J+	0.045
Isophorone	570	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Naphthalene	1	< 0.0025 U						< 0.017 U			0.013	0.0022 J+	0.0069 J+
Nitrobenzene	4.9	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
n-Nitrosodimethylamine	0.002	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
n-Nitroso-di-n-propylamine	0.078	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
n-Nitrosodiphenylamine	20	< 0.89 UJ									< 0.31 U	< 0.019 U	< 0.019 U
Pentachlorophenol	0.8	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
Phenanthrene	**5.5**	0.0066 J						0.20	0.0045	< 0.00093 U	0.27	0.039	0.18
Phenol	30	< 4.4 UJ									< 1.5 UJ	< 0.093 U	< 0.093 U
Pyrene	**10**	0.097						0.32	0.0084	0.0066	0.45	0.098	0.46
Total BaP PAHs Calculated	**0.493**	0.0554						0.277	0.00614	0.00533	0.346	0.0290	0.255
Total HMW PAHs Calculated	**1.791**	0.35						1.4	0.035	0.028	1.7	0.25	1.5
Total LMW PAHs Calculated	**3.8**	0.12						0.91	0.015	0.0091	1.0	0.16	0.75

Notes:
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N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
R - Rejected.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5	CH-AOC-H6	CH-AOC-H6	CH-AOC-H6	CH-AOC-H9	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	H5-SS02	H5-SS03	H5-SS04	H6-SB01	H6-SB02	H6-SB03	H9-SS01	P113-SB02	P113-SB03	WDS-SB01	WDS-SB04	WDS-SB05
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/12/2016	6/12/2016	6/12/2016	6/6/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria (1) (mg/kg)**												
VOCs													
1,1,1,2-Tetrachloroethane	0.07	< 0.28 U									< 0.00072 U	< 0.063 UJ	< 0.067 UJ
1,1,1-Trichloroethane	0.04	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,1,2,2-Tetrachloroethane	0.19	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,1,2-Trichloroethane	0.15	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,1-Dichloroethane	0.14	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,1-Dichloroethene	0.04	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,2,3-Trichloropropane	0.0051	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,2,4-Trimethylbenzene	0.09								< 0.089 UJ	< 0.083 U			
1,2-Dibromo-3-chloropropane	0.0053	< 0.92 U									< 0.0024 U	< 0.11 U	< 0.11 U
1,2-Dibromoethane	0.036	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,2-Dichloroethane	0.4	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,2-Dichloropropane	1	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
1,3,5-Trimethylbenzene	0.16								< 0.089 U	< 0.083 U			
2-Butanone	100	< 2.3 U									0.017 J	< 0.53 U	< 0.56 U
2-Hexanone	20	< 0.46 U									< 0.0024 U	< 0.063 U	< 0.067 U
4-Isopropyltoluene	0.18								< 0.089 UJ	< 0.083 U			
Acetone	100	0.83 J									0.22 J	0.11 J	< 0.45 U
Benzene	0.12	< 0.28 U							< 0.089 U	< 0.083 U	< 0.00072 U	< 0.063 U	< 0.067 U
Bromodichloromethane	0.29	< 0.28 U									< 0.00072 U	< 0.063 UJ	< 0.067 UJ
Bromoform	0.07	< 0.28 UJ									< 0.00072 U	< 0.063 U	< 0.067 U
Carbon disulfide	77	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Carbon tetrachloride	0.05	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Chlorobenzene	28	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Chloroethane	1400	< 0.92 U									< 0.0012 U	< 0.42 UJ	< 0.45 UJ
Chloroform	0.05	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Chloromethane	11	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
cis-1,2-Dichloroethene	0.04	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
cis-1,3-Dichloropropene	NE	< 0.28 U									< 0.00072 U	< 0.063 UJ	< 0.067 U
Dibromochloromethane	8.3	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Dichlorodifluoromethane	8.7	< 0.92 U									< 0.00072 U	< 0.063 U	< 0.067 U
Ethylbenzene	0.27	< 0.28 U							< 0.089 U	< 0.083 U	< 0.00072 U	< 0.063 U	< 0.067 U
Isopropylbenzene	0.04								< 0.089 U	< 0.083 U			
Methyl tert-butyl ether	47								< 0.089 U	< 0.083 U			
Methylene chloride	2.6	< 0.46 U									< 0.0024 U	< 0.063 U	0.055 J
Naphthalene	1								< 0.089 UJ	< 0.083 U			
n-Butylbenzene	100								< 0.089 U	< 0.083 U			
n-Propylbenzene	100								< 0.089 U	< 0.083 U			
sec-Butylbenzene	100								< 0.089 U	< 0.083 U			
Styrene	1.2	< 0.28 U									< 0.00072 U	< 0.063 UJ	< 0.067 UJ
tert-Butylbenzene	100								< 0.089 U	< 0.083 U			
Tetrachloroethene	0.06	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U

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1. See Table 2 for selected surface soil criteria without petroleum criteria.
Surface Criteria exceedances are highlighted and bolded

Table 6
Preliminary Screening of Surface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5	CH-AOC-H6	CH-AOC-H6	CH-AOC-H6	CH-AOC-H9	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	H5-SS02	H5-SS03	H5-SS04	H6-SB01	H6-SB02	H6-SB03	H9-SS01	P113-SB02	P113-SB03	WDS-SB01	WDS-SB04	WDS-SB05
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/12/2016	6/12/2016	6/12/2016	6/6/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**Surface Criteria (1) (mg/kg)**												
Toluene	0.15	< 0.28 U							< 0.089 U	< 0.083 U	< 0.00072 U	< 0.063 U	< 0.067 U
trans-1,2-Dichloroethene	0.04	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
trans-1,3-Dichloropropene	1.8	< 0.28 U									< 0.00072 U	< 0.063 UJ	< 0.067 U
Trichloroethene	0.41	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Trichlorofluoromethane	52	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Vinyl Acetate	91	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Vinyl chloride	0.059	< 0.28 U									< 0.00072 U	< 0.063 U	< 0.067 U
Xylenes (total)	0.1	< 0.83 U							< 0.27 U	< 0.25 U	< 0.0022 U	< 0.16 U	< 0.17 U

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1. See Table 2 for selected surface soil criteria without petroleum criteria.
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Preliminary Screening of Surface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-AST35	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB
	Location ID	AST35-SB03	FPH-SB01	FPH-SB01	FPH-SB02	FPH-SB03	MP-SB02	MP-SB02	MP-SB03	STB-SS05	STB-SS06	STB-SS07
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	FD	N	N	N	FD	N	N	N	N	N
Chemical	**Surface Criteria [1] (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	10						< 0.039 U	< 0.037 U	< 0.040 U			
1,3-Dinitrobenzene	0.08						< 0.039 U	< 0.037 U	< 0.040 U			
2,4,6-Trinitrotoluene	3.6						< 0.039 U	< 0.037 U	< 0.040 U			
2,4-Dinitrotoluene	1.7						< 0.039 U	< 0.037 U	< 0.040 U			
2,6-Dinitrotoluene	0.36						< 0.039 U	< 0.037 U	< 0.040 U			
2-Amino-4,6-dinitrotoluene	14						< 0.039 U	< 0.037 U	< 0.040 U			
2-Nitrotoluene	0.19						< 0.039 U	< 0.037 U	< 0.040 U			
3-Nitrotoluene	0.63						< 0.039 U	< 0.037 U	< 0.040 U			
4-Amino-2,6-Dinitro Toluene	12						< 0.039 U	< 0.037 U	< 0.040 U			
4-Nitrotoluene	0.14						< 0.039 U	< 0.037 U	< 0.040 U			
Hexahydro-1,3,5-trinitro-1,3,5-triazine	2.3						< 0.039 U	< 0.037 U	< 0.040 U			
Methyl-2,4,6-trinitrophenylnitramine	1.5						< 0.039 U	< 0.037 U	< 0.040 U			
Nitrobenzene	4.9						< 0.039 U	< 0.037 U	< 0.040 U			
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	16						< 0.039 U	< 0.037 U	< 0.040 U			
PCBs												
Aroclor 1016	0.41								< 0.0074 U			
Aroclor 1221	0.2								< 0.0074 U			
Aroclor 1232	0.17								< 0.0074 U			
Aroclor 1242	0.041								< 0.0074 U			
Aroclor 1248	0.0072								< 0.0074 U			
Aroclor 1254	0.041								< 0.0074 U			
Aroclor 1260	0.24								< 0.0074 U			
Aroclor 1262	0.24								< 0.0074 U			
Aroclor 1268	0.24								< 0.0074 U			
SVOCs												
1,2,4-Trichlorobenzene	0.27						< 0.018 U	< 0.018 U	< 0.018 U			
1,2-Dichlorobenzene	0.09						< 0.018 U	< 0.018 U	< 0.018 U			
1,3-Dichlorobenzene	0.08						< 0.018 U	< 0.018 U	< 0.018 U			
1,4-Dichlorobenzene	0.88						< 0.018 U	< 0.018 U	< 0.018 U			
2,4,5-Trichlorophenol	4						< 0.035 U	< 0.035 U	< 0.036 U			
2,4,6-Trichlorophenol	6.3						< 0.035 U	< 0.035 U	< 0.036 U			
2,4-Dichlorophenol	0.05						< 0.088 U	< 0.089 U	< 0.090 U			
2,4-Dimethylphenol	0.04						< 0.088 U	< 0.089 U	< 0.090 U			
2,4-Dinitrophenol	0.15						< 0.18 U	< 0.18 U	< 0.18 U			
2,4-Dinitrotoluene	1.7						< 0.018 U	< 0.018 U	< 0.018 U			
2,6-Dinitrotoluene	0.36						< 0.018 U	< 0.018 U	< 0.018 U			
2-Chloronaphthalene	480						< 0.018 U	< 0.018 U	< 0.018 U			
2-Chlorophenol	0.06						< 0.088 U	< 0.089 U	< 0.090 U			
2-Methylphenol	0.1						< 0.088 U	< 0.089 U	< 0.090 U			
2-Nitroaniline	5.4						< 0.018 U	< 0.018 U	< 0.018 U			
2-Nitrophenol	7						< 0.088 U	< 0.089 U	< 0.090 U			
3,3-Dichlorobenzidine	0.03						< 0.70 UJ	< 0.71 UJ	< 0.72 UJ			
3,4-Methylphenol	NE						< 0.088 U	< 0.089 U	< 0.090 U			
3-Nitroaniline	63						< 0.018 U	< 0.018 U	< 0.018 U			
4,6-Dinitro-2-methylphenol	0.51						< 0.088 U	< 0.089 U	< 0.090 U			
4-Bromophenyl-phenylether	NE						< 0.088 U	< 0.089 U	< 0.090 U			
4-Chloro-3-methylphenol	630						< 0.035 U	< 0.035 U	< 0.036 U			

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PCB - Polychlorinated Biphenyl.
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1. See Table 3 for selected surface soil criteria with petroleum criteria included.
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Table 7
Preliminary Screening of Surface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-AST35	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB
	Location ID	AST35-SB03	FPH-SB01	FPH-SB01	FPH-SB02	FPH-SB03	MP-SB02	MP-SB02	MP-SB03	STB-SS05	STB-SS06	STB-SS07
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	FD	N	N	N	FD	N	N	N	N	N
Chemical	**Surface Criteria [(1)] (mg/kg)**											
4-Chloroaniline	1						< 0.088 U	< 0.089 U	< 0.090 U			
4-Chlorophenyl-phenylether	NE						< 0.018 U	< 0.018 U	< 0.018 U			
4-Nitroaniline	25						< 0.088 U	< 0.089 U	< 0.090 U			
4-Nitrophenol	7						< 0.35 U	< 0.35 U	< 0.36 U			
Acenaphthene	20	< 0.00076 U	0.0030	0.0035	0.0036	0.0013	0.0071 J	0.055 J	0.0037 J-	0.00079	0.00096	0.0010
Acenaphthylene	29	< 0.00076 U	< 0.00074 U	< 0.00076 U	0.0019	0.0030	< 0.00071 UJ	0.0029 J	< 0.0022 UJ	< 0.00075 U	< 0.00077 U	0.0018
Anthracene	6.8	0.00095	0.0039 J	0.0072 J	0.0076	0.12	0.018 J	0.16 J	0.0055 J-	0.0021	0.0023	0.0026
Benzo(a)anthracene	0.8	0.0061	0.0021 J	0.025 J	0.033	0.011	0.046 J	0.32 J	0.025 J-	0.011	0.016	0.017
Benzo(a)pyrene	0.247	0.0046	0.0016 J	0.015 J	0.023	0.0081	0.032 J	0.24 J	0.020 J-	0.0095	0.015	0.015
Benzo(b)fluoranthene	1	0.0080	0.0035 J	0.026 J	0.038	0.017	0.054 J	0.34 J	0.026 J-	0.017	0.024	0.024
Benzo(g,h,i)perylene	18	0.0036	0.0016 J	0.0090 J	0.016	0.0074	0.022 J	0.093 J	0.0022 J-	< 0.00075 U	< 0.00077 U	0.0067
Benzo(k)fluoranthene	0.8	0.0017	0.0010 J	0.0047 J	0.013	0.0036	0.021 J	0.14 J	0.014 J-	0.0036	0.0071	0.011
Benzoic acid	100						< 0.35 U	< 0.35 U	< 0.36 U			
Benzyl Alcohol	630						< 0.018 U	< 0.018 U	< 0.018 U			
Bis(2-chloro-1-methylethyl) ether	310						< 0.018 U	< 0.018 U	< 0.018 U			
Bis(2-chloroethoxy)methane	19						< 0.018 U	< 0.018 U	< 0.018 U			
Bis(2-chloroethyl)ether	0.23						< 0.035 U	< 0.035 U	< 0.036 U			
Bis(2-ethylhexyl)phthalate	0.02						< 0.035 U	< 0.035 U	< 0.036 U			
Butyl benzyl phthalate	0.59						< 0.035 U	< 0.035 U	< 0.036 U			
CARBAZOLE	240						< 0.018 UJ	0.058 J	< 0.018 U			
Chrysene	1	0.0041	0.0019 J	0.015 J	0.025	0.0090	0.033 J	0.26 J	0.021 J-	0.011	0.016	0.015
Dibenz(a,h)anthracene	0.115	0.00083	< 0.00074 UJ	0.0039 J	0.0046	0.0018	0.0096	0.015	< 0.0022 UJ	< 0.00075 U	< 0.00077 U	< 0.00081 U
Dibenzofuran	0.15						< 0.018 UJ	0.030 J	< 0.018 U			
Diethyl phthalate	0.23						< 0.018 U	< 0.018 U	< 0.018 U			
Dimethyl phthalate	38						< 0.018 U	< 0.018 U	< 0.018 U			
Di-n-butyl phthalate	0.011						< 0.035 U	< 0.035 U	< 0.036 U			
Di-n-octyl phthalate	0.21						< 0.018 U	< 0.018 U	< 0.018 U			
Fluoranthene	10	0.0087	0.0041 J	0.046 J	0.058	0.015	0.099 J	0.76 J	0.055 J-	0.025	0.036	0.036
Fluorene	30	< 0.00076 U	0.0030	0.0041	0.0056	< 0.00084 U	0.0072 J	0.062 J	0.0033 J-	0.00080	0.00097	0.0012
Hexachlorobenzene	0.079						< 0.018 U	< 0.018 U	< 0.018 U			
Hexachlorobutadiene	0.1						< 0.018 U	< 0.018 U	< 0.018 U			
Hexachloroethane	0.024						< 0.018 U	< 0.018 U	< 0.018 U			
Indeno(1,2,3-cd)pyrene	0.5	0.0030	0.0013 J	0.0076 J	0.014	0.0062	0.022 J	0.12 J	< 0.0022 UJ	0.0062	0.0081	0.0067
Isophorone	100						< 0.018 U	< 0.018 U	< 0.018 U			
Nitrobenzene	3.7						< 0.018 U	< 0.018 U	< 0.018 U			
n-Nitrosodimethylamine	0.002						< 0.018 U	< 0.018 U	< 0.018 U			
n-Nitroso-di-n-propylamine	0.078						< 0.018 U	< 0.018 U	< 0.018 U			
n-Nitrosodiphenylamine	20						< 0.018 U	< 0.018 U	< 0.018 U			
Pentachlorophenol	0.8						< 0.088 U	< 0.089 U	< 0.090 U			
Phenanthrene	5.5	0.0068	0.0047 J	0.037 J	0.053	0.030	0.058 J	0.51 J	0.033 J-	0.010	0.015	0.015
Phenol	30						< 0.088 U	< 0.089 U	< 0.090 U			
Pyrene	10	0.0088	0.0039 J	0.038 J	0.049	0.018	0.074 J	0.57 J	0.044 J-	0.020	0.030	0.031
Total BaP PAHs Calculated	0.493	0.00716	0.00304	0.0248	0.0363	0.0134	0.0540	0.335	0.0277	0.0137	0.0207	0.0207
Total HMW PAHs Calculated	**1.791**	0.039	0.017	0.14	0.20	0.079	0.29	**2.0**	0.14	0.076	0.11	0.12
Total LMW PAHs Calculated	3.8	0.019	0.019	0.099	0.13	0.17	0.19	1.5	0.10	0.039	0.056	0.058
VOCs												
1,2,4-Trimethylbenzene	0.09	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 UJ	< 0.084 UJ	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
1,3,5-Trimethylbenzene	0.16	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
4-Isopropyltoluene	0.18	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U

Notes:
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FD - Field duplicate.
ft - feet.
J - Estimated value.
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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
VOC - Volatile Organic Compound.
1. See Table 3 for selected surface soil criteria with petroleum criteria included.
Surface Criteria exceedances are highlighted and bolded

Table 7
Preliminary Screening of Surface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-AST35	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB
	Location ID	AST35-SB03	FPH-SB01	FPH-SB01	FPH-SB02	FPH-SB03	MP-SB02	MP-SB02	MP-SB03	STB-SS05	STB-SS06	STB-SS07
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
	Sample Type	N	FD	N	N	N	FD	N	N	N	N	N
Chemical	**Surface Criteria (1) (mg/kg)**											
Benzene	0.06	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
Ethylbenzene	0.27	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
Isopropylbenzene	0.04	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
Methyl tert-butyl ether	0.93	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
Naphthalene	1	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 UJ	< 0.066 U	< 0.069 U	< 0.062 U
n-Butylbenzene	12	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
n-Propylbenzene	3.9	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
sec-Butylbenzene	11	< 0.00082 U	< 0.00092 U	< 0.0011 U	< 0.058 U	< 0.084 U	< 0.00096 U	< 0.00088 U	< 0.0016 U	< 0.066 U	< 0.069 U	< 0.062 U
tert-Butylbenzene	5.9	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
Toluene	0.15	< 0.00049 U	< 0.00055 U	< 0.00065 U	< 0.058 U	< 0.084 U	< 0.00058 U	< 0.00053 U	< 0.00095 U	< 0.066 U	< 0.069 U	< 0.062 U
Xylenes (total)	0.1	< 0.0015 U	< 0.0017 U	< 0.0020 U	< 0.18 U	< 0.25 U	< 0.0017 U	< 0.0016 U	< 0.0029 U	< 0.20 U	< 0.21 U	< 0.19 U

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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
VOC - Volatile Organic Compound.
1. See Table 3 for selected surface soil criteria with petroleum criteria included.
Surface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-201	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010
	Location ID	034-SB01	034-SS02	034-SS02	034-SS03	034-SS04	034-SS04	034-SS05	201-SB01	2010-SB01	2010-SB01	2010-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/16/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	N	FD	N	N	FD	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220											
1,3-Dinitrobenzene	0.63											
2,4,6-Trinitrotoluene	3.6											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Amino-4,6-dinitrotoluene	15											
2-Nitrotoluene	3.2											
3-Nitrotoluene	0.63											
4-Amino-2,6-Dinitro Toluene	15											
4-Nitrotoluene	25											
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1											
Methyl-2,4,6-trinitrophenylnitramine	16											
Nitrobenzene	5.1											
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390											
Metals												
Aluminum	27822	**16000**	**16000**	**16000**	**5000**	**7400**	**8700**	**12000**	**5100**			
Antimony	10.3	**1.9**	**2.5**	**2.3**	**2.3**	**2.1**	**2.2**	**2.0**	**2.3**			
Arsenic	**3.383**	**1.9**	**1.5 J**	**2.4**	**1.9**	**1.6**	**1.5**	**2.2**	**1.3 J**			
Barium	350	**26**	**28**	**22**	**7.8**	**33**	**41**	**18**	**28**			
Beryllium	14	**0.091 J**	< 0.040 UJ	**0.019 J**	< 0.035 U	< 0.035 U	< 0.036 U	< 0.040 U	< 0.035 U			
Cadmium	2.5	**0.21**	**0.029 J**	< 0.041 UJ	< 0.035 U	< 0.035 U	< 0.036 U	< 0.040 U	**0.030 J**			
Calcium (Ca)	**751.8**	**1800**	**1100**	**1100**	**490**	**480**	**460**	**530**	**730**			
Chromium	**33.92**	**15**	**15**	**15**	**8.2**	**13**	**12**	**15**	**8.9**			
Cobalt	10.24	**2.1**	**2.7**	**2.5**	**2.4**	**2.3**	**2.3**	**2.2**	**2.3**			
Copper	270	**18**	**19**	**27**	**20**	**25**	**28**	**21**	**21**			
Iron (Fe)	**19000**	**8300**	**8900**	**14000**	**9800**	**12000**	**13000**	**9400**	**8600**			
Lead	400	**5.2**	**5.1**	**5.7**	**1.7 J**	**2.2 J**	**2.4 J**	**3.9 J**	**1.1 J**	**4.0**	**4.6**	**4.9**
Magnesium (Mg)	8315	**1600**	**1900**	**1800**	**700**	**1300**	**1500**	**1500**	**1500**			
Manganese (Mn)	656.8	**130**	**120**	**120**	**100**	**210**	**230**	**120**	**100**			
Nickel	140	**7.9**	**8.3**	**7.6**	**3.4 J**	**5.0**	**5.3**	**7.9**	**4.8**			
Potassium (K)	NE	**730**	**900**	**760**	**310**	**930**	**1200**	**610**	**1200**			
Selenium	36	< 1.3 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.1 U			
Silver	36	< 0.21 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.20 U	< 0.18 U			
Sodium (Na)	**320**	**100**	**94**	**92**	**53**	**84**	**84**	**67**	**120**			
Thallium	0.414	**0.058 J**	**0.090 J**	**0.068 J**	**0.035 J**	**0.086 J**	**0.10 J**	**0.067 J**	**0.062 J**			
Vanadium	**46.28**	**25**	**21**	**29**	**14**	**17**	**18**	**24**	**13**			
Zinc	2200	**19**	**20**	**21**	**7.4**	**13**	**13**	**16**	**9.8**			
PCBs												
Aroclor 1016	0.41	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1221	0.2	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1232	0.17	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1242	0.23	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1248	0.23	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1254	0.12	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1260	0.24	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1262	0.24	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			
Aroclor 1268	0.24	< 0.0090 U	< 0.0081 U	< 0.0084 U	< 0.0071 U	< 0.0072 U	< 0.0073 U	< 0.0080 U	< 0.0071 U			

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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-201	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010
	Location ID	034-SB01	034-SS02	034-SS02	034-SS03	034-SS04	034-SS04	034-SS05	201-SB01	2010-SB01	2010-SB01	2010-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/16/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	N	FD	N	N	FD	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8								< 0.018 U			
1,2-Dichlorobenzene	100								< 0.018 U			
1,3-Dichlorobenzene	17								< 0.018 U			
1,4-Dichlorobenzene	2.6								< 0.018 U			
1-Methylnaphthalene	18	< 0.00089 U	< 0.00081 U	< 0.00084 U	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			
2,4,5-Trichlorophenol	630								< 0.036 U			
2,4,6-Trichlorophenol	6.3								< 0.036 U			
2,4-Dichlorophenol	19								< 0.091 U			
2,4-Dimethylphenol	130								< 0.091 U			
2,4-Dinitrophenol	13								< 0.18 UJ			
2,4-Dinitrotoluene	1.7								< 0.018 U			
2,6-Dinitrotoluene	0.36								< 0.018 U			
2-Chloronaphthalene	480								< 0.018 U			
2-Chlorophenol	39								< 0.091 U			
2-Methylnaphthalene	24	< 0.00089 U	< 0.00081 UJ	**0.0011 J**	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			
2-Methylphenol	100								< 0.091 U			
2-Nitroaniline	63								< 0.018 U			
2-Nitrophenol	13								< 0.091 U			
3,3-Dichlorobenzidine	1.2								< 0.73 UJ			
3,4-Methylphenol	NE								< 0.091 U			
3-Nitroaniline	63								< 0.018 U			
4,6-Dinitro-2-methylphenol	0.51								< 0.091 U			
4-Bromophenyl-phenylether	NE								< 0.091 U			
4-Chloro-3-methylphenol	630								< 0.036 U			
4-Chloroaniline	2.7								< 0.091 U			
4-Chlorophenyl-phenylether	NE								< 0.018 U			
4-Nitroaniline	25								< 0.091 U			
4-Nitrophenol	13								< 0.36 U			
Acenaphthene	100	< 0.00089 U	< 0.00081 UJ	**0.0015 J**	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			
Acenaphthylene	100	< 0.00089 U	< 0.00081 UJ	**0.0012 J**	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			
Anthracene	100	< 0.00089 U	< 0.00081 UJ	**0.0038 J**	< 0.00071 U	< 0.00072 UJ	**0.0013 J**	< 0.00082 U	< 0.0073 U			
Benzo(a)anthracene	**1**	< 0.00089 U	**0.0073 J**	**0.031 J**	< 0.00071 U	**0.0011 J**	**0.0071 J**	**0.00086**	< 0.0073 U			
Benzo(a)pyrene	**0.115**	< 0.00089 U	**0.0061 J**	**0.024 J**	< 0.00071 U	< 0.00072 UJ	**0.0038 J**	< 0.00082 U	< 0.0073 U			
Benzo(b)fluoranthene	**1**	< 0.00089 U	**0.012 J**	**0.054 J**	< 0.00071 U	< 0.00072 UJ	**0.0077 J**	**0.0019**	< 0.0073 U			
Benzo(g,h,i)perylene	100	< 0.00089 U	**0.0030 J**	**0.012 J**	< 0.00071 U	< 0.00072 UJ	**0.0019 J**	< 0.00082 U	< 0.0073 U			
Benzo(k)fluoranthene	**1**	< 0.00089 U	**0.0023 J**	**0.011 J**	< 0.00071 U	**0.0012**	**0.0015**	< 0.00082 U	< 0.0073 U			
Benzoic acid	25000								< 0.36 UJ			
Benzyl Alcohol	630								< 0.018 U			
Bis(2-chloro-1-methylethyl) ether	310								< 0.018 U			
Bis(2-chloroethoxy)methane	19								< 0.018 U			
Bis(2-chloroethyl)ether	0.23								< 0.036 U			
Bis(2-ethylhexyl)phthalate	39								< 0.036 U			
Butyl benzyl phthalate	290								< 0.036 U			
CARBAZOLE	240								< 0.018 U			
Chrysene	**1**	< 0.00089 U	**0.0043 J**	**0.019 J**	< 0.00071 U	< 0.00072 UJ	**0.0035 J**	< 0.00082 U	< 0.0073 U			
Dibenz(a,h)anthracene	**0.115**	< 0.00089 U	**0.00090 J**	**0.0046 J**	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-201	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010
	Location ID	034-SB01	034-SS02	034-SS02	034-SS03	034-SS04	034-SS04	034-SS05	201-SB01	2010-SB01	2010-SB01	2010-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/16/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	N	FD	N	N	FD	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Dibenzofuran	**7.3**								< 0.018 U			
Diethyl phthalate	5100								< 0.018 U			
Dimethyl phthalate	5100								< 0.018 U			
Di-n-butyl phthalate	630								< 0.036 U			
Di-n-octyl phthalate	63								< 0.018 U			
Fluoranthene	100	< 0.00089 U	**0.0098 J**	**0.072 J**	< 0.00071 U	**0.0017 J**	**0.0091 J**	**0.0012**	< 0.0073 U			
Fluorene	100	< 0.00089 U	< 0.00081 UJ	**0.0016 J**	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			
Hexachlorobenzene	0.21								< 0.018 U			
Hexachlorobutadiene	1.2								< 0.018 U			
Hexachloroethane	1.8								< 0.018 U			
Indeno(1,2,3-cd)pyrene	**0.5**	< 0.00089 U	**0.0025 J**	**0.010 J**	< 0.00071 U	< 0.00072 UJ	**0.0016 J**	< 0.00082 U	< 0.0073 U			
Isophorone	570								< 0.018 U			
Naphthalene	3.8	< 0.00089 U	< 0.00081 UJ	**0.0011 J**	< 0.00071 U	< 0.00072 U	< 0.00072 U	< 0.00082 U	< 0.0073 U			
Nitrobenzene	5.1								< 0.018 U			
n-Nitrosodimethylamine	0.002								< 0.018 U			
n-Nitroso-di-n-propylamine	0.078								< 0.018 U			
n-Nitrosodiphenylamine	110								< 0.018 U			
Pentachlorophenol	1								< 0.091 UJ			
Phenanthrene	100	< 0.00089 U	**0.0049 J**	**0.023 J**	< 0.00071 U	**0.0015 J**	**0.0051 J**	< 0.00082 U	< 0.0073 U			
Phenol	100								< 0.091 U			
Pyrene	100	< 0.00089 U	**0.0099 J**	**0.060 J**	< 0.00071 U	**0.0016 J**	**0.0089 J**	**0.0013**	< 0.0073 U			
Total BaP PAHs Calculated	**0.115**	**0.00206**	**0.00921**	**0.0382**	**0.00164**	**0.00171**	**0.00618**	**0.00201**	**0.0169**			
VOCs												
1,1,1,2-Tetrachloroethane	2								< 0.00068 U			
1,1,1-Trichloroethane	100								< 0.00068 U			
1,1,2,2-Tetrachloroethane	0.6								< 0.00068 U			
1,1,2-Trichloroethane	0.15								< 0.00068 U			
1,1-Dichloroethane	3.6								< 0.00068 U			
1,1-Dichloroethene	23								< 0.00068 U			
1,2,3-Trichloropropane	0.0051								< 0.00068 U			
1,2,4-Trimethylbenzene	5.8											
1,2-Dibromo-3-chloropropane	0.0053								< 0.0023 UJ			
1,2-Dibromoethane	0.036								< 0.00068 U			
1,2-Dichloroethane	0.46								< 0.00068 U			
1,2-Dichloropropane	1								< 0.00068 U			
1,3,5-Trimethylbenzene	47											
2-Butanone	100								< 0.011 UJ			
2-Hexanone	20								< 0.0023 U			
4-Isopropyltoluene	190											
Acetone	100								**0.043 J-**			
Benzene	1.2								< 0.00068 U			
Bromodichloromethane	0.29								< 0.00068 U			
Bromoform	19								< 0.00068 U			
Carbon disulfide	77								< 0.00068 U			
Carbon tetrachloride	0.65								< 0.00068 U			

Notes:
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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
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1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-034	CH-AOC-201	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010
	Location ID	034-SB01	034-SS02	034-SS02	034-SS03	034-SS04	034-SS04	034-SS05	201-SB01	2010-SB01	2010-SB01	2010-SB01
	Sample Date	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016	6/16/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	N	FD	N	N	FD	N	N	N	N	N	N
Chemical	**SubSurface Criteria [1] (mg/kg)**											
Chlorobenzene	28								< 0.00068 U			
Chloroethane	1400								< 0.0011 U			
Chloroform	0.32								< 0.00068 U			
Chloromethane	11								< 0.00068 UJ			
cis-1,2-Dichloroethene	16								< 0.00068 U			
cis-1,3-Dichloropropene	NE								< 0.00068 U			
Dibromochloromethane	8.3								< 0.00068 U			
Dichlorodifluoromethane	8.7								< 0.00068 U			
Ethylbenzene	5.8								< 0.00068 U			
Isopropylbenzene	190											
Methyl tert-butyl ether	47											
Methylene chloride	35								< 0.0023 UJ			
Naphthalene	3.8											
n-Butylbenzene	100											
n-Propylbenzene	100											
sec-Butylbenzene	100											
Styrene	600								< 0.00068 U			
tert-Butylbenzene	100											
Tetrachloroethene	5.5								< 0.00068 U			
Toluene	100								< 0.00068 U			
trans-1,2-Dichloroethene	100								< 0.00068 U			
trans-1,3-Dichloropropene	1.8								< 0.00068 U			
Trichloroethene	0.41								< 0.00068 U			
Trichlorofluoromethane	2300								< 0.00068 U			
Vinyl Acetate	91								< 0.00068 U			
Vinyl chloride	0.059								< 0.00068 U			
Xylenes (total)	58								< 0.0021 U			

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PCB - Polychlorinated Biphenyl.
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SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C
	Location ID	2010-SB02	2010-SB02	2010-SB02	2010-SB02	EFO-SB01	F100C-SB01	F100C-SB01	F100C-SB01	F100C-SB02	F100C-SB02	F100C-SB02
	Sample Date	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/13/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	FD	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220					< 0.038 U						
1,3-Dinitrobenzene	0.63					< 0.038 U						
2,4,6-Trinitrotoluene	3.6					< 0.038 U						
2,4-Dinitrotoluene	1.7					< 0.038 U						
2,6-Dinitrotoluene	0.36					< 0.038 U						
2-Amino-4,6-dinitrotoluene	15					< 0.038 U						
2-Nitrotoluene	3.2					< 0.038 U						
3-Nitrotoluene	0.63					< 0.038 U						
4-Amino-2,6-Dinitro Toluene	15					< 0.038 U						
4-Nitrotoluene	25					< 0.038 U						
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1					< 0.038 U						
Methyl-2,4,6-trinitrophenylnitramine	16					< 0.038 U						
Nitrobenzene	5.1					< 0.038 U						
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390					< 0.038 U						
Metals												
Aluminum	27822											
Antimony	10.3											
Arsenic	**3.383**											
Barium	350											
Beryllium	14											
Cadmium	2.5											
Calcium (Ca)	**751.8**											
Chromium	**33.92**											
Cobalt	10.24											
Copper	270											
Iron (Fe)	**19000**											
Lead	400	**16 J**	**6.2 J**	**5.7**	**4.8**		**4.9**	**5.6**	**3.9**	**5.2**	**5.1**	**5.1**
Magnesium (Mg)	8315											
Manganese (Mn)	656.8											
Nickel	140											
Potassium (K)	NE											
Selenium	36											
Silver	36											
Sodium (Na)	**320**											
Thallium	0.414											
Vanadium	**46.28**											
Zinc	2200											
PCBs												
Aroclor 1016	0.41											
Aroclor 1221	0.2											
Aroclor 1232	0.17											
Aroclor 1242	0.23											
Aroclor 1248	0.23											
Aroclor 1254	0.12											
Aroclor 1260	0.24											
Aroclor 1262	0.24											
Aroclor 1268	0.24											

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Table 8
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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C
	Location ID	2010-SB02	2010-SB02	2010-SB02	2010-SB02	EFO-SB01	F100C-SB01	F100C-SB01	F100C-SB01	F100C-SB02	F100C-SB02	F100C-SB02
	Sample Date	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/13/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	FD	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8											
1,2-Dichlorobenzene	100											
1,3-Dichlorobenzene	17											
1,4-Dichlorobenzene	2.6											
1-Methylnaphthalene	18											
2,4,5-Trichlorophenol	630											
2,4,6-Trichlorophenol	6.3											
2,4-Dichlorophenol	19											
2,4-Dimethylphenol	130											
2,4-Dinitrophenol	13											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Chloronaphthalene	480											
2-Chlorophenol	39											
2-Methylnaphthalene	24											
2-Methylphenol	100											
2-Nitroaniline	63											
2-Nitrophenol	13											
3,3-Dichlorobenzidine	1.2											
3,4-Methylphenol	NE											
3-Nitroaniline	63											
4,6-Dinitro-2-methylphenol	0.51											
4-Bromophenyl-phenylether	NE											
4-Chloro-3-methylphenol	630											
4-Chloroaniline	2.7											
4-Chlorophenyl-phenylether	NE											
4-Nitroaniline	25											
4-Nitrophenol	13											
Acenaphthene	100											
Acenaphthylene	100											
Anthracene	100											
Benzo(a)anthracene	**1**											
Benzo(a)pyrene	**0.115**											
Benzo(b)fluoranthene	**1**											
Benzo(g,h,i)perylene	100											
Benzo(k)fluoranthene	**1**											
Benzoic acid	25000											
Benzyl Alcohol	630											
Bis(2-chloro-1-methylethyl) ether	310											
Bis(2-chloroethoxy)methane	19											
Bis(2-chloroethyl)ether	0.23											
Bis(2-ethylhexyl)phthalate	39											
Butyl benzyl phthalate	290											
CARBAZOLE	240											
Chrysene	**1**											
Dibenz(a,h)anthracene	**0.115**											

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C
	Location ID	2010-SB02	2010-SB02	2010-SB02	2010-SB02	EFO-SB01	F100C-SB01	F100C-SB01	F100C-SB01	F100C-SB02	F100C-SB02	F100C-SB02
	Sample Date	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/13/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	FD	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [1] (mg/kg)**											
Dibenzofuran	**7.3**											
Diethyl phthalate	5100											
Dimethyl phthalate	5100											
Di-n-butyl phthalate	630											
Di-n-octyl phthalate	63											
Fluoranthene	100											
Fluorene	100											
Hexachlorobenzene	0.21											
Hexachlorobutadiene	1.2											
Hexachloroethane	1.8											
Indeno(1,2,3-cd)pyrene	**0.5**											
Isophorone	570											
Naphthalene	3.8											
Nitrobenzene	5.1											
n-Nitrosodimethylamine	0.002											
n-Nitroso-di-n-propylamine	0.078											
n-Nitrosodiphenylamine	110											
Pentachlorophenol	1											
Phenanthrene	100											
Phenol	100											
Pyrene	100											
Total BaP PAHs Calculated	**0.115**											
VOCs												
1,1,1,2-Tetrachloroethane	2											
1,1,1-Trichloroethane	100											
1,1,2,2-Tetrachloroethane	0.6											
1,1,2-Trichloroethane	0.15											
1,1-Dichloroethane	3.6											
1,1-Dichloroethene	23											
1,2,3-Trichloropropane	0.0051											
1,2,4-Trimethylbenzene	5.8											
1,2-Dibromo-3-chloropropane	0.0053											
1,2-Dibromoethane	0.036											
1,2-Dichloroethane	0.46											
1,2-Dichloropropane	1											
1,3,5-Trimethylbenzene	47											
2-Butanone	100											
2-Hexanone	20											
4-Isopropyltoluene	190											
Acetone	100											
Benzene	1.2											
Bromodichloromethane	0.29											
Bromoform	19											
Carbon disulfide	77											
Carbon tetrachloride	0.65											

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-2010	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-F100C
	Location ID	2010-SB02	2010-SB02	2010-SB02	2010-SB02	EFO-SB01	F100C-SB01	F100C-SB01	F100C-SB01	F100C-SB02	F100C-SB02	F100C-SB02
	Sample Date	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/13/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016	6/10/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	7 - 8 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft	4 - 5 ft	5 - 6 ft	6 - 7 ft
	Sample Type	FD	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Chlorobenzene	28											
Chloroethane	1400											
Chloroform	0.32											
Chloromethane	11											
cis-1,2-Dichloroethene	16											
cis-1,3-Dichloropropene	NE											
Dibromochloromethane	8.3											
Dichlorodifluoromethane	8.7											
Ethylbenzene	5.8											
Isopropylbenzene	190											
Methyl tert-butyl ether	47											
Methylene chloride	35											
Naphthalene	3.8											
n-Butylbenzene	100											
n-Propylbenzene	100											
sec-Butylbenzene	100											
Styrene	600											
tert-Butylbenzene	100											
Tetrachloroethene	5.5											
Toluene	100											
trans-1,2-Dichloroethene	100											
trans-1,3-Dichloropropene	1.8											
Trichloroethene	0.41											
Trichlorofluoromethane	2300											
Vinyl Acetate	91											
Vinyl chloride	0.059											
Xylenes (total)	58											

Notes:
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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H16
	Location ID	H1-SS01	H1-SS02	H11-SB01	H11-SB01	H11-SB02	H11-SB02	H12-SB01	H14-SB01	H14-SB01	H14-SB03	H16-SB01
	Sample Date	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/13/2016	6/21/2016	6/13/2016	6/13/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	3 - 4 ft	3 - 4 ft	5 - 6 ft	4 - 5 ft	6 - 7 ft	6 - 7 ft	5 - 6 ft	4 - 5 ft
	Sample Type	N	N	N	N	N	N	N	FD	N	N	FD
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220											
1,3-Dinitrobenzene	0.63											
2,4,6-Trinitrotoluene	3.6											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Amino-4,6-dinitrotoluene	15											
2-Nitrotoluene	3.2											
3-Nitrotoluene	0.63											
4-Amino-2,6-Dinitro Toluene	15											
4-Nitrotoluene	25											
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1											
Methyl-2,4,6-trinitrophenylnitramine	16											
Nitrobenzene	5.1											
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390											
Metals												
Aluminum	27822	6100	7500	3300	7200	12000	9800	6700	3000 J	8200 J	8600	14000
Antimony	10.3	1.1	2.3	0.39 J	0.78	1.9	2.7	2.0	1.7	2.6	3.4	2.6
Arsenic	**3.383**	< 0.88 U	< 0.77 U	**11**	**9.4**	1.8	2.4	1.7	2.1	2.0	1.8	2.9 J
Barium	350	22	58	13	16	20	22	23	20 J	35 J	30	89 J
Beryllium	14	0.025 J	0.47	0.075 J	0.17 J	0.34	0.33	0.11 J	0.071 J	0.092 J	0.043 J	0.57 J
Cadmium	2.5	0.045 J	0.41	0.049 J	0.033 J	0.19 J	0.090 J	0.051 J	< 0.034 UJ	0.042 J	< 0.035 U	0.59 J
Calcium (Ca)	**751.8**	**790**	**1300**	**980**	**830**	**920**	**1600**	**790**	190 J	320 J	740	**4200 J**
Chromium	**33.92**	8.2	13	5.4	14	12	13	9.7	7.7	12	17	11
Cobalt	10.24	1.1	2.3	0.46 J	0.87	1.9	2.7	2.1	1.7	2.6	3.5	2.4
Copper	270	7.3	15	18	40	26	25	22	21	28	31	30 J
Iron (Fe)	**19000**	2900	5500	7000	17000	11000	10000	8100	8300	12000	12000	6600
Lead	400	2.9 J	3.3 J	3.8 J	2.7 J	9.7	10	18	1.5 J	2.5 J	2.3 J	22 J
Magnesium (Mg)	8315	640	1800	380	740	1000	1600	1100	730 J	1600 J	2200	1600
Manganese (Mn)	656.8	49	97	52	75	98	130	100	83 J	210 J	160	63
Nickel	140	2.4 J	7.4	3.0 J	5.2	7.0	7.6	4.9	2.2 J	5.4 J	8.9	12 J
Potassium (K)	NE	410	680	210	270	460	800	610	520 J	1200 J	1200	870
Selenium	36	< 1.3 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.0 U	< 1.1 U	< 1.0 U	< 3.5 U
Silver	36	< 0.22 U	0.31 J	< 0.19 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.19 U	< 0.17 U	< 0.18 U	< 0.17 U	< 0.58 U
Sodium (Na)	**320**	69	120	55	52	70	81	59	48	70	140	**460 J**
Thallium	0.414	0.050 J	0.057 J	0.062 J	0.063 J	0.076 J	0.074 J	0.075 J	0.077 J	0.14 J	0.15	< 0.12 UJ
Vanadium	**46.28**	7.7	10	8.9	24	20	18	12	7.7 J	16 J	18	15
Zinc	2200	12	25	5.0	8.6	35	29	17	6.3 J	13 J	15	86 J
PCBs												
Aroclor 1016	0.41	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1221	0.2	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1232	0.17	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1242	0.23	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1248	0.23	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1254	0.12	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	0.077	< 0.0075 U				< 0.024 U
Aroclor 1260	0.24	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1262	0.24	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U
Aroclor 1268	0.24	< 0.0089 U	< 0.0081 U	< 0.0078 U	< 0.0080 U	< 0.0080 U	< 0.0079 U	< 0.0075 U				< 0.024 U

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J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H16
	Location ID	H1-SS01	H1-SS02	H11-SB01	H11-SB01	H11-SB02	H11-SB02	H12-SB01	H14-SB01	H14-SB01	H14-SB03	H16-SB01
	Sample Date	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/13/2016	6/21/2016	6/13/2016	6/13/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	3 - 4 ft	3 - 4 ft	5 - 6 ft	4 - 5 ft	6 - 7 ft	6 - 7 ft	5 - 6 ft	4 - 5 ft
	Sample Type	N	N	N	N	N	N	N	FD	N	N	FD
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8	< 0.022 U	< 0.020 U									< 0.060 U
1,2-Dichlorobenzene	100	< 0.022 U	< 0.020 U									< 0.060 U
1,3-Dichlorobenzene	17	< 0.022 U	< 0.020 U									< 0.060 U
1,4-Dichlorobenzene	2.6	< 0.022 U	< 0.020 U									< 0.060 U
1-Methylnaphthalene	18	< 0.00091 U	< 0.00079 U	**0.0034**	< 0.00080 U	**6.2**	**0.39**	**0.0059**	< 0.00068 U	< 0.00071 U	< 0.00072 U	< 0.0024 U
2,4,5-Trichlorophenol	630	< 0.045 U	< 0.040 U									< 0.12 U
2,4,6-Trichlorophenol	6.3	< 0.045 U	< 0.040 U									< 0.12 U
2,4-Dichlorophenol	19	< 0.11 U	< 0.10 U									< 0.30 U
2,4-Dimethylphenol	130	< 0.11 U	< 0.10 U									< 0.30 U
2,4-Dinitrophenol	13	< 0.22 U	< 0.20 U									< 0.60 U
2,4-Dinitrotoluene	1.7	< 0.022 U	< 0.020 U									< 0.060 U
2,6-Dinitrotoluene	0.36	< 0.022 U	< 0.020 U									< 0.060 U
2-Chloronaphthalene	480	< 0.022 U	< 0.020 U									< 0.060 U
2-Chlorophenol	39	< 0.11 U	< 0.10 U									< 0.30 U
2-Methylnaphthalene	24	< 0.00091 U	< 0.00079 U	**0.0045**	< 0.00080 U	**6.0**	**0.23**	**0.0075**	< 0.00068 U	< 0.00071 U	< 0.00072 U	**0.0027 J**
2-Methylphenol	100	< 0.11 U	< 0.10 U									< 0.30 U
2-Nitroaniline	63	< 0.022 U	< 0.020 U									< 0.060 U
2-Nitrophenol	13	< 0.11 U	< 0.10 U									< 0.30 U
3,3-Dichlorobenzidine	1.2	< 0.89 U	< 0.80 U									< 2.4 U
3,4-Methylphenol	NE	< 0.11 U	< 0.10 U									< 0.30 U
3-Nitroaniline	63	< 0.022 U	< 0.020 U									< 0.060 U
4,6-Dinitro-2-methylphenol	0.51	< 0.11 U	< 0.10 U									< 0.30 U
4-Bromophenyl-phenylether	NE	< 0.11 U	< 0.10 U									< 0.30 U
4-Chloro-3-methylphenol	630	< 0.045 U	< 0.040 U									< 0.12 U
4-Chloroaniline	2.7	< 0.11 U	< 0.10 U									< 0.30 U
4-Chlorophenyl-phenylether	NE	< 0.022 U	< 0.020 U									< 0.060 U
4-Nitroaniline	25	< 0.11 U	< 0.10 U									< 0.30 U
4-Nitrophenol	13	< 0.45 U	< 0.40 U									< 1.2 U
Acenaphthene	100	< 0.00091 U	< 0.00079 U	**0.0018**	< 0.00080 U	< 0.16 U	**0.93**	**0.0023**	< 0.00068 U	< 0.00071 U	< 0.00072 U	< 0.0024 U
Acenaphthylene	100	< 0.00091 U	< 0.00079 U	**0.00087**	< 0.00080 U	**0.34**	**0.20**	**0.0016**	< 0.00068 U	< 0.00071 U	< 0.00072 U	< 0.0024 U
Anthracene	100	< 0.00091 U	< 0.00079 U	**0.0056**	< 0.00080 U	**5.7**	**5.7**	**0.0076**	< 0.00068 U	< 0.00071 U	< 0.00072 U	< 0.0024 UJ
Benzo(a)anthracene	**1**	**0.0019 J+**	< 0.00079 U	**0.028**	< 0.00080 U	**0.27**	**5.6**	**0.055**	< 0.00068 UJ	**0.00079 J**	**0.0013 J+**	**0.012**
Benzo(a)pyrene	**0.115**	**0.30**	< 0.00079 U	**0.026**	< 0.00080 U	**0.13**	**2.8**	**0.030**	< 0.00068 UJ	**0.00073 J**	**0.00094 J+**	**0.012**
Benzo(b)fluoranthene	**1**	**0.0030 J+**	< 0.00079 U	**0.049**	< 0.00080 U	**0.25**	**6.2**	**0.058**	< 0.00068 UJ	**0.0016 J**	**0.0020 J+**	**0.024**
Benzo(g,h,i)perylene	100	**0.0016 J+**	< 0.00079 U	**0.0099**	< 0.00080 U	**0.095**	**3.2**	**0.017 J+**	< 0.00068 U	< 0.00071 U	< 0.00072 U	**0.0063**
Benzo(k)fluoranthene	**1**	**0.0020 J+**	< 0.00079 U	**0.011**	< 0.00080 U	**0.068**	**1.6**	**0.016**	< 0.00068 U	< 0.00071 U	< 0.00072 U	**0.0078**
Benzoic acid	25000	**0.24 J**	< 0.40 UJ									**0.60 J**
Benzyl Alcohol	630	< 0.022 U	< 0.020 U									< 0.060 U
Bis(2-chloro-1-methylethyl) ether	310	< 0.022 U	< 0.020 U									< 0.060 U
Bis(2-chloroethoxy)methane	19	< 0.022 U	< 0.020 U									< 0.060 U
Bis(2-chloroethyl)ether	0.23	< 0.045 U	< 0.040 U									< 0.12 U
Bis(2-ethylhexyl)phthalate	39	< 0.045 U	< 0.040 U									< 0.12 U
Butyl benzyl phthalate	290	< 0.045 U	< 0.040 U									< 0.12 U
CARBAZOLE	240	< 0.022 U	< 0.020 U									< 0.060 U
Chrysene	**1**	**0.0021 J+**	< 0.00079 U	**0.025**	< 0.00080 U	**0.18**	**4.3**	**0.032**	< 0.00068 UJ	**0.00090 J**	**0.0012 J+**	**0.012**
Dibenz(a,h)anthracene	**0.115**	< 0.00091 U	< 0.00079 U	**0.0035**	< 0.00080 U	< 0.016 U	**0.50**	**0.0014**	< 0.00068 U	< 0.00071 U	< 0.00072 U	< 0.0024 U

Notes:
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FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
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PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
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VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H16
	Location ID	H1-SS01	H1-SS02	H11-SB01	H11-SB01	H11-SB02	H11-SB02	H12-SB01	H14-SB01	H14-SB01	H14-SB03	H16-SB01
	Sample Date	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/13/2016	6/21/2016	6/13/2016	6/13/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	3 - 4 ft	3 - 4 ft	5 - 6 ft	4 - 5 ft	6 - 7 ft	6 - 7 ft	5 - 6 ft	4 - 5 ft
	Sample Type	N	N	N	N	N	N	N	FD	N	N	FD
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Dibenzofuran	**7.3**	< 0.022 U	< 0.020 U									< 0.060 U
Diethyl phthalate	5100	< 0.022 U	< 0.020 U									< 0.060 U
Dimethyl phthalate	5100	< 0.022 U	< 0.020 U									< 0.060 U
Di-n-butyl phthalate	630	< 0.045 U	< 0.040 U									< 0.12 U
Di-n-octyl phthalate	63	< 0.022 U	< 0.020 U									< 0.060 U
Fluoranthene	100	**0.0051 J+**	< 0.00079 U	**0.063**	< 0.00080 U	**0.48**	**12**	**0.071**	< 0.00068 UJ	**0.0018 J**	**0.0033 J+**	**0.023**
Fluorene	100	< 0.00091 U	< 0.00079 U	**0.0014**	< 0.00080 U	**0.50**	**1.1**	**0.0022**	< 0.00068 U	< 0.00071 U	< 0.00072 U	< 0.0024 U
Hexachlorobenzene	0.21	< 0.022 U	< 0.020 U									< 0.060 U
Hexachlorobutadiene	1.2	< 0.022 U	< 0.020 U									< 0.060 U
Hexachloroethane	1.8	< 0.022 U	< 0.020 U									< 0.060 U
Indeno(1,2,3-cd)pyrene	**0.5**	**0.0016 J+**	< 0.00079 U	**0.010**	< 0.00080 U	**0.081**	**2.7**	**0.017**	< 0.00068 U	< 0.00071 U	< 0.00072 U	**0.0063**
Isophorone	570	< 0.022 U	< 0.020 U									< 0.060 U
Naphthalene	3.8	< 0.00091 U	< 0.00079 U	**0.0033**	< 0.00080 U	**0.72**	**1.0**	**0.0054**	< 0.00068 U	< 0.00071 U	< 0.00072 U	**0.0034 J**
Nitrobenzene	5.1	< 0.022 U	< 0.020 U									< 0.060 U
n-Nitrosodimethylamine	0.002	< 0.022 U	< 0.020 U									< 0.060 U
n-Nitroso-di-n-propylamine	0.078	< 0.022 U	< 0.020 U									< 0.060 U
n-Nitrosodiphenylamine	110	< 0.022 U	< 0.020 U									< 0.060 U
Pentachlorophenol	1	< 0.11 U	< 0.10 U									< 0.30 U
Phenanthrene	100	**0.0025 J+**	< 0.00079 U	**0.020**	< 0.00080 U	**7.0**	**8.9**	**0.040**	< 0.00068 UJ	**0.0011 J**	**0.0026 J+**	**0.0081**
Phenol	100	< 0.11 U	< 0.10 U									< 0.30 U
Pyrene	100	**0.0041 J+**	< 0.00079 U	**0.063**	< 0.00080 U	**1.2**	**8.7**	**0.070**	< 0.00068 UJ	**0.0015 J**	**0.0025 J+**	**0.020**
Total BaP PAHs Calculated	**0.115**	**0.302**	**0.00183**	**0.0383**	**0.00185**	**0.207**	**4.77**	**0.0446**	**0.00157**	**0.00176**	**0.00207**	**0.0187**
VOCs												
1,1,1,2-Tetrachloroethane	2	< 0.11 UJ	< 0.073 UJ					< 0.00055 U				< 0.00080 U
1,1,1-Trichloroethane	100	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,1,2,2-Tetrachloroethane	0.6	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,1,2-Trichloroethane	0.15	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,1-Dichloroethane	3.6	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,1-Dichloroethene	23	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,2,3-Trichloropropane	0.0051	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,2,4-Trimethylbenzene	5.8											
1,2-Dibromo-3-chloropropane	0.0053	< 0.19 U	< 0.12 U					< 0.0018 U				< 0.0027 U
1,2-Dibromoethane	0.036	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,2-Dichloroethane	0.46	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,2-Dichloropropane	1	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
1,3,5-Trimethylbenzene	47											
2-Butanone	100	< 0.95 U	< 0.61 U					**0.0078 J**				< 0.013 UJ
2-Hexanone	20	< 0.11 U	< 0.073 U					< 0.0018 U				< 0.0027 U
4-Isopropyltoluene	190											
Acetone	100	**0.18 J**	< 0.49 U					< 0.0018 UJ				< 0.0027 UJ
Benzene	1.2	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Bromodichloromethane	0.29	< 0.11 UJ	< 0.073 UJ					< 0.00055 U				< 0.00080 U
Bromoform	19	< 0.11 U	< 0.073 U					< 0.00055 UJ				< 0.00080 U
Carbon disulfide	77	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Carbon tetrachloride	0.65	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H1	CH-AOC-H1	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H14	CH-AOC-H16
	Location ID	H1-SS01	H1-SS02	H11-SB01	H11-SB01	H11-SB02	H11-SB02	H12-SB01	H14-SB01	H14-SB01	H14-SB03	H16-SB01
	Sample Date	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/13/2016	6/21/2016	6/13/2016	6/13/2016
	Depth Interval	1 - 2 ft	1 - 2 ft	1 - 2 ft	3 - 4 ft	3 - 4 ft	5 - 6 ft	4 - 5 ft	6 - 7 ft	6 - 7 ft	5 - 6 ft	4 - 5 ft
	Sample Type	N	N	N	N	N	N	N	FD	N	N	FD
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Chlorobenzene	28	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Chloroethane	1400	< 0.76 UJ	< 0.49 UJ					< 0.00091 U				< 0.0013 U
Chloroform	0.32	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Chloromethane	11	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
cis-1,2-Dichloroethene	16	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
cis-1,3-Dichloropropene	NE	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Dibromochloromethane	8.3	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Dichlorodifluoromethane	8.7	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Ethylbenzene	5.8	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Isopropylbenzene	190											
Methyl tert-butyl ether	47											
Methylene chloride	35	< 0.11 U	< 0.073 U					< 0.0018 U				< 0.0027 UJ
Naphthalene	3.8											
n-Butylbenzene	100											
n-Propylbenzene	100											
sec-Butylbenzene	100											
Styrene	600	< 0.11 UJ	< 0.073 UJ					< 0.00055 U				< 0.00080 U
tert-Butylbenzene	100											
Tetrachloroethene	5.5	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Toluene	100	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
trans-1,2-Dichloroethene	100	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
trans-1,3-Dichloropropene	1.8	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Trichloroethene	0.41	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Trichlorofluoromethane	2300	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Vinyl Acetate	91	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Vinyl chloride	0.059	< 0.11 U	< 0.073 U					< 0.00055 U				< 0.00080 U
Xylenes (total)	58	< 0.29 U	< 0.18 U					< 0.0016 U				< 0.0024 U

Notes:
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FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H17	CH-AOC-H18	CH-AOC-H18	CH-AOC-H2	CH-AOC-H2	CH-AOC-H20	CH-AOC-H20	CH-AOC-H21
	Location ID	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS02	H2-SS01	H2-SS02	H20-SS01	H20-SS02	H21-SB02
	Sample Date	6/13/2016	6/9/2016	6/16/2016	6/9/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/14/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220											
1,3-Dinitrobenzene	0.63											
2,4,6-Trinitrotoluene	3.6											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Amino-4,6-dinitrotoluene	15											
2-Nitrotoluene	3.2											
3-Nitrotoluene	0.63											
4-Amino-2,6-Dinitro Toluene	15											
4-Nitrotoluene	25											
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1											
Methyl-2,4,6-trinitrophenylnitramine	16											
Nitrobenzene	5.1											
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390											
Metals												
Aluminum	27822	**13000**	**6900 J+**	**11000**	**18000**	**4800**	**3000**	**6300**	**12000 J+**	**14000**	**8100 J+**	**8000**
Antimony	10.3	**1.9**	**3.0**	**3.3**	**4.9**	**1.4**	**1.2**	**2.6**	**3.8**	**4.8**	**3.2**	**3.2**
Arsenic	**3.383**	**1.3 J**	**1.4**	**2.0**	**2.2**	**1.8**	**1.1 J**	**0.84 J**	**2.5**	**1.6**	**2.0**	**1.4 J**
Barium	350	**23 J**	**16**	**22**	**35**	**11**	**7.2**	**25**	**35 J+**	**58**	**40 J+**	**24**
Beryllium	14	**0.12 J**	< 0.036 U	**0.084 J**	**0.13 J**	< 0.035 U	< 0.034 U	**0.080 J**	**0.20**	**0.58**	**0.38**	**0.078 J**
Cadmium	2.5	**0.066 J**	**0.031 J**	**0.055 J**	**0.060 J**	**0.031 J**	< 0.034 U	**0.090 J**	**0.14 J**	**0.036 J**	< 0.037 U	**0.026 J**
Calcium (Ca)	**751.8**	**830 J**	**640 J**	**490**	**460**	**860**	**470**	**410**	**650 J+**	**1700**	**1000 J+**	**680**
Chromium	**33.92**	**14**	**10**	**14**	**17**	**7.2**	**5.2**	**9.6**	**18 J+**	**20**	**21 J+**	**11**
Cobalt	10.24	**1.9**	**3.3**	**3.3**	**4.7**	**1.5**	**1.3**	**2.6**	**3.8**	**4.9**	**3.3**	**3.3**
Copper	270	**16 J**	**29 J+**	**37**	**38**	**16**	**14**	**31**	**42 J+**	**33**	**67 J+**	**28**
Iron (Fe)	**19000**	**5000**	**14000 J+**	**18000**	**18000**	**6700**	**6000**	**11000**	**16000 J+**	**12000**	**26000 J-**	**12000**
Lead	400	**5.0 J**	**2.2 J**	**3.5 J**	**5.1**	**2.3 J**	**1.1 J**	**7.1**	**7.4**	**3.0 J**	**3.0 J**	**3.0 J**
Magnesium (Mg)	8315	**2000**	**1300 J+**	**1200**	**2600**	**1000**	**610**	**1400**	**2300 J+**	**4100**	**2400 J+**	**1300**
Manganese (Mn)	656.8	**82**	**210 J**	**140**	**170**	**110**	**73**	**140**	**260 J+**	**180**	**180 J**	**180**
Nickel	140	**7.0 J**	**6.5**	**6.1**	**9.9**	**3.5**	**2.2 J**	**5.7**	**9.3**	**14**	**16 J+**	**6.6**
Potassium (K)	NE	**820**	**840 J-**	**470**	**770**	**590**	**340**	**1000**	**1400 J+**	**2600**	**1600 J+**	**670**
Selenium	36	< 1.2 U	< 1.1 UJ	< 1.1 U	< 1.1 U	< 1.1 U	< 1.0 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 UJ	< 1.1 U
Silver	36	< 0.20 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.17 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.18 U
Sodium (Na)	**320**	**110 J**	**77**	**59**	**63**	**61**	**47**	**56**	**83 J+**	**160**	**110**	**81**
Thallium	0.414	**0.075 J**	**0.089 J**	**0.090 J**	**0.12 J**	**0.041 J**	**0.041 J**	**0.078 J**	**0.13 J**	**0.14 J**	**0.14 J**	**0.071 J**
Vanadium	**46.28**	**14**	**19 J+**	**28**	**25**	**11**	**7.9**	**13**	**23 J+**	**29**	**18 J+**	**20**
Zinc	2200	**18 J**	**14**	**14**	**22**	**9.6**	**5.9**	**160**	**110 J+**	**27**	**26**	**13**
PCBs												
Aroclor 1016	0.41	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1221	0.2	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1232	0.17	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1242	0.23	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1248	0.23	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1254	0.12	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1260	0.24	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1262	0.24	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U
Aroclor 1268	0.24	< 0.0082 U	< 0.0073 UJ	< 0.0075 UJ	< 0.0077 U	< 0.0071 U	< 0.0068 U	< 0.0075 U	< 0.0079 U	< 0.0077 U	< 0.0078 UJ	< 0.0075 U

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Montauk, New York

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	Location ID	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS02	H2-SS01	H2-SS02	H20-SS01	H20-SS02	H21-SB02
	Sample Date	6/13/2016	6/9/2016	6/16/2016	6/9/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/14/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
1,2-Dichlorobenzene	100	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
1,3-Dichlorobenzene	17	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
1,4-Dichlorobenzene	2.6	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
1-Methylnaphthalene	18	< 0.00083 U	**0.0040 J+**	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.00099 J+**	**0.0010 J+**	**0.015**	< 0.00078 U	< 0.0023 U
2,4,5-Trichlorophenol	630	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U
2,4,6-Trichlorophenol	6.3	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U
2,4-Dichlorophenol	19	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
2,4-Dimethylphenol	130	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
2,4-Dinitrophenol	13	< 0.20 U	< 0.19 UJ	< 0.19 UJ	< 0.19 UJ	< 0.18 U	< 0.17 U	< 0.18 U	< 0.20 U	< 0.19 UJ	< 0.19 UJ	< 0.19 U
2,4-Dinitrotoluene	1.7	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
2,6-Dinitrotoluene	0.36	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
2-Chloronaphthalene	480	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
2-Chlorophenol	39	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
2-Methylnaphthalene	24	**0.0011 J**	**0.0017**	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.0015 J+**	**0.0019 J+**	**0.016**	< 0.00078 U	< 0.0023 U
2-Methylphenol	100	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
2-Nitroaniline	63	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
2-Nitrophenol	13	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
3,3-Dichlorobenzidine	1.2	< 0.82 U	< 0.74 UJ	< 0.77 UJ	< 0.77 UJ	< 0.70 UJ	< 0.68 UJ	< 0.74 U	< 0.81 UJ	< 0.76 U	< 0.77 UJ	< 0.75 U
3,4-Methylphenol	NE	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
3-Nitroaniline	63	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
4,6-Dinitro-2-methylphenol	0.51	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
4-Bromophenyl-phenylether	NE	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 UJ	< 0.095 U	< 0.096 U	< 0.094 U
4-Chloro-3-methylphenol	630	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U
4-Chloroaniline	2.7	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
4-Chlorophenyl-phenylether	NE	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
4-Nitroaniline	25	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 UJ	< 0.095 U	< 0.096 U	< 0.094 U
4-Nitrophenol	13	< 0.41 U	< 0.37 U	< 0.38 U	< 0.38 U	< 0.35 U	< 0.34 U	< 0.37 U	< 0.41 U	< 0.38 U	< 0.39 U	< 0.38 U
Acenaphthene	100	< 0.00083 U	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.00087 J+**	**0.0012 J+**	**0.082**	**0.0033**	< 0.0023 U
Acenaphthylene	100	< 0.00083 U	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	< 0.00076 U	**0.00090 J+**	**0.041**	**0.0022**	< 0.0023 U
Anthracene	100	**0.0015 J**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.0020 J+**	**0.0024 J+**	**0.13**	**0.0029**	< 0.0023 U
Benzo(a)anthracene	**1**	**0.014**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.029 J+**	**0.014 J**	**0.35**	**0.017 J-**	< 0.0023 U
Benzo(a)pyrene	**0.115**	**0.015**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.029 J+**	**0.013 J**	**0.24**	**0.011**	< 0.0023 U
Benzo(b)fluoranthene	**1**	**0.027**	**0.0011**	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.055**	**0.023 J+**	**0.45**	**0.021**	< 0.0023 U
Benzo(g,h,i)perylene	100	**0.0063**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.00092 J+**	< 0.00078 U	**0.10**	**0.0053**	< 0.0023 U
Benzo(k)fluoranthene	**1**	**0.0098**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.0056 J+**	**0.0053 J**	**0.096**	**0.0078 J-**	< 0.0023 U
Benzoic acid	25000	**0.25 J**	< 0.37 UJ	< 0.38 UJ	< 0.38 UJ	< 0.35 U	< 0.34 U	< 0.37 UJ	< 0.41 UJ	< 0.38 UJ	< 0.39 UJ	< 0.38 UJ
Benzyl Alcohol	630	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Bis(2-chloro-1-methylethyl) ether	310	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Bis(2-chloroethoxy)methane	19	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Bis(2-chloroethyl)ether	0.23	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U
Bis(2-ethylhexyl)phthalate	39	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 UJ	< 0.038 U	< 0.039 U	< 0.038 U
Butyl benzyl phthalate	290	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 UJ	< 0.038 U	< 0.039 U	< 0.038 U
CARBAZOLE	240	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
Chrysene	**1**	**0.013**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.027 J+**	**0.014 J**	**0.40**	**0.019 J**	< 0.0023 U
Dibenz(a,h)anthracene	**0.115**	< 0.00083 U	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.0016 J+**	< 0.00078 UJ	**0.049**	**0.0019**	< 0.0023 U

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U - Not detected.
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1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H17	CH-AOC-H18	CH-AOC-H18	CH-AOC-H2	CH-AOC-H2	CH-AOC-H20	CH-AOC-H20	CH-AOC-H21
	Location ID	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS02	H2-SS01	H2-SS02	H20-SS01	H20-SS02	H21-SB02
	Sample Date	6/13/2016	6/9/2016	6/16/2016	6/9/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/14/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Dibenzofuran	**7.3**	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	**0.012 J**	< 0.019 U	< 0.019 U
Diethyl phthalate	5100	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
Dimethyl phthalate	5100	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
Di-n-butyl phthalate	630	< 0.041 U	< 0.037 U	< 0.038 U	< 0.038 U	< 0.035 U	< 0.034 U	< 0.037 U	< 0.041 UJ	< 0.038 U	< 0.039 U	**0.021 J**
Di-n-octyl phthalate	63	< 0.020 U	**0.020 J**	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Fluoranthene	100	**0.027**	**0.0014**	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.032 J+**	**0.028 J**	**1.0**	**0.032 J**	< 0.0023 U
Fluorene	100	< 0.00083 U	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.00094 J+**	**0.0013 J+**	**0.096**	**0.0024**	< 0.0023 U
Hexachlorobenzene	0.21	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 U
Hexachlorobutadiene	1.2	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Hexachloroethane	1.8	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Indeno(1,2,3-cd)pyrene	**0.5**	**0.0063**	< 0.00074 U	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.020 J+**	**0.0053 J**	**0.11**	**0.0057**	< 0.0023 U
Isophorone	570	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Naphthalene	3.8	**0.0013 J**	**0.0010**	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.0013 J+**	**0.0014 J+**	**0.018**	**0.00097**	< 0.0023 U
Nitrobenzene	5.1	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
n-Nitrosodimethylamine	0.002	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
n-Nitroso-di-n-propylamine	0.078	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
n-Nitrosodiphenylamine	110	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U	< 0.018 U	< 0.017 U	< 0.018 U	< 0.020 U	< 0.019 U	< 0.019 U	< 0.019 U
Pentachlorophenol	1	< 0.10 U	< 0.093 UJ	< 0.096 UJ	< 0.096 UJ	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
Phenanthrene	100	**0.0080**	**0.00084**	< 0.00077 U	< 0.00077 U	< 0.0070 U	**0.0021**	**0.012 J+**	**0.015 J+**	**0.29**	**0.0077 J+**	< 0.0023 U
Phenol	100	< 0.10 U	< 0.093 U	< 0.096 U	< 0.096 U	< 0.088 U	< 0.085 U	< 0.092 U	< 0.10 U	< 0.095 U	< 0.096 U	< 0.094 U
Pyrene	100	**0.024**	**0.0011**	< 0.00077 U	< 0.00077 U	< 0.0070 U	< 0.0021 U	**0.032 J+**	**0.023 J**	**0.68**	**0.027 J**	< 0.0023 U
Total BaP PAHs Calculated	**0.115**	**0.0207**	**0.00175**	**0.00178**	**0.00178**	**0.0162**	**0.00485**	**0.0411**	**0.0181**	**0.381**	**0.0174**	**0.00532**
VOCs												
1,1,1,2-Tetrachloroethane	2	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 UJ	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 UJ
1,1,1-Trichloroethane	100	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
1,1,2,2-Tetrachloroethane	0.6	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
1,1,2-Trichloroethane	0.15	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
1,1-Dichloroethane	3.6	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
1,1-Dichloroethene	23	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
1,2,3-Trichloropropane	0.0051	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
1,2,4-Trimethylbenzene	5.8											
1,2-Dibromo-3-chloropropane	0.0053	< 0.0028 U	< 0.0018 UJ	< 0.0020 UJ	< 0.0019 UJ	< 0.0020 U	< 0.0021 U	< 0.097 U	< 0.0020 UJ	< 0.0084 U	< 0.0022 U	< 0.093 U
1,2-Dibromoethane	0.036	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
1,2-Dichloroethane	0.46	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
1,2-Dichloropropane	1	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
1,3,5-Trimethylbenzene	47											
2-Butanone	100	< 0.014 UJ	< 0.0092 UJ	**0.0064 J**	< 0.0097 UJ	< 0.0098 U	< 0.011 U	< 0.49 U	**0.013 J**	< 0.042 U	**0.0069 J**	< 0.47 U
2-Hexanone	20	< 0.0028 U	< 0.0018 U	< 0.0020 U	< 0.0019 U	< 0.0020 U	< 0.0021 U	< 0.058 U	< 0.0020 UJ	< 0.0084 U	< 0.0022 U	< 0.056 U
4-Isopropyltoluene	190											
Acetone	100	< 0.0028 UJ	**0.010 J**	**0.068 J-**	**0.078 J-**	< 0.0020 UJ	< 0.0021 UJ	< 0.39 U	**0.22 J**	< 0.0084 UJ	**0.15 J+**	**0.13 J**
Benzene	1.2	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Bromodichloromethane	0.29	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 UJ	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 UJ
Bromoform	19	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 UJ	< 0.00064 UJ	< 0.058 U	< 0.00059 UJ	< 0.0025 UJ	< 0.00065 UJ	< 0.056 U
Carbon disulfide	77	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
Carbon tetrachloride	0.65	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U

Notes:
All units are in milligrams per kilogram (mg/kg).
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Camp Hero Remedial Investigation
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	Location Group	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H17	CH-AOC-H18	CH-AOC-H18	CH-AOC-H2	CH-AOC-H2	CH-AOC-H20	CH-AOC-H20	CH-AOC-H21
	Location ID	H16-SB01	H17-SB01	H17-SB02	H17-SB03	H18-SS01	H18-SS02	H2-SS01	H2-SS02	H20-SS01	H20-SS02	H21-SB02
	Sample Date	6/13/2016	6/9/2016	6/16/2016	6/9/2016	6/12/2016	6/12/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/14/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	9 - 10 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Chlorobenzene	28	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Chloroethane	1400	< 0.0014 U	< 0.00092 U	< 0.0010 U	< 0.00097 U	< 0.00098 U	< 0.0011 U	< 0.39 UJ	< 0.00099 U	< 0.0042 U	< 0.0011 U	< 0.37 UJ
Chloroform	0.32	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
Chloromethane	11	< 0.00085 U	< 0.00055 UJ	< 0.00061 UJ	< 0.00058 UJ	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
cis-1,2-Dichloroethene	16	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
cis-1,3-Dichloropropene	NE	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Dibromochloromethane	8.3	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 UJ	< 0.00064 UJ	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Dichlorodifluoromethane	8.7	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
Ethylbenzene	5.8	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Isopropylbenzene	190											
Methyl tert-butyl ether	47											
Methylene chloride	35	< 0.0028 UJ	< 0.0018 UJ	< 0.0020 UJ	< 0.0019 U	< 0.0020 U	< 0.0021 UJ	< 0.058 U	< 0.0020 UJ	< 0.0084 U	< 0.0022 U	**0.070 J**
Naphthalene	3.8											
n-Butylbenzene	100											
n-Propylbenzene	100											
sec-Butylbenzene	100											
Styrene	600	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 UJ	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 UJ
tert-Butylbenzene	100											
Tetrachloroethene	5.5	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Toluene	100	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
trans-1,2-Dichloroethene	100	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
trans-1,3-Dichloropropene	1.8	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Trichloroethene	0.41	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 UJ	< 0.0025 U	< 0.00065 U	< 0.056 U
Trichlorofluoromethane	2300	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
Vinyl Acetate	91	< 0.00085 U	< 0.00055 UJ	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
Vinyl chloride	0.059	< 0.00085 U	< 0.00055 U	< 0.00061 U	< 0.00058 U	< 0.00059 U	< 0.00064 U	< 0.058 U	< 0.00059 U	< 0.0025 U	< 0.00065 U	< 0.056 U
Xylenes (total)	58	< 0.0025 U	< 0.0017 UJ	< 0.0018 U	< 0.0018 U	< 0.0018 U	< 0.0019 U	< 0.15 U	< 0.0018 UJ	< 0.0076 U	< 0.0019 U	< 0.14 U

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Montauk, New York

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	Location ID	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB02	H4-SB03	H5-SS01	H5-SS02	H5-SS03	H5-SS04
	Sample Date	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016
	Depth Interval	5 - 6 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220											
1,3-Dinitrobenzene	0.63											
2,4,6-Trinitrotoluene	3.6											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Amino-4,6-dinitrotoluene	15											
2-Nitrotoluene	3.2											
3-Nitrotoluene	0.63											
4-Amino-2,6-Dinitro Toluene	15											
4-Nitrotoluene	25											
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1											
Methyl-2,4,6-trinitrophenylnitramine	16											
Nitrobenzene	5.1											
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390											
Metals												
Aluminum	27822	**1300**	**11000**	**9400**	**14000**	**12000**			**15000**	**6000**		
Antimony	10.3	**0.86**	**4.3**	**1.3**	**1.7**	**2.5**			**0.98**	**1.3**		
Arsenic	**3.383**	< 0.70 U	**1.9**	**1.6**	**2.1**	**1.6**			< 0.91 U	**0.77 J**		
Barium	350	**10**	**32**	**13**	**19**	**25**			**19**	**17**		
Beryllium	14	**0.45**	**0.055 J**	**0.019 J**	**0.10 J**	**0.078 J**			**0.29**	**1.3**		
Cadmium	2.5	**0.36**	< 0.036 U	**0.034 J**	**0.030 J**	< 0.040 U			**0.074 J**	**1.1**		
Calcium (Ca)	**751.8**	**160**	**580**	**420**	**460**	**490**			**290**	**240**		
Chromium	**33.92**	**0.77**	**16**	**9.0**	**15**	**15**			**17**	**5.9**		
Cobalt	10.24	**0.87**	**4.3**	**1.3**	**1.8**	**2.5**			**0.90 J**	**1.3**		
Copper	270	**3.9**	**31**	**18**	**31**	**30**			**8.1**	**12**		
Iron (Fe)	**19000**	**1000**	**12000**	**9000**	**15000**	**14000**			**2200**	**670**		
Lead	400	**2.1 J**	**3.4 J**	**3.8 J**	**5.6**	**4.8**	**3.2 J**	**2.8 J**	**6.3**	**4.3 J**	**44**	**5.0 J**
Magnesium (Mg)	8315	**170**	**2200**	**630**	**1100**	**1000**			**880**	**160**		
Manganese (Mn)	656.8	**40**	**230**	**83**	**82**	**99**			**39**	**14**		
Nickel	140	**1.8 J**	**8.8**	**3.9**	**6.4**	**6.1**			**3.9 J**	**3.0 J**		
Potassium (K)	NE	**300**	**1300**	**280**	**350**	**360**			**580**	**330**		
Selenium	36	< 1.1 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.2 U			< 1.4 U	< 1.5 U		
Silver	36	**0.25 J**	< 0.18 U	< 0.20 U	< 0.20 U	< 0.20 U			< 0.23 U	**0.67 J**		
Sodium (Na)	**320**	**130**	**90**	**51**	**82**	**58**			**81**	**130**		
Thallium	0.414	< 0.036 U	**0.12 J**	**0.048 J**	**0.066 J**	**0.094 J**			**0.078 J**	**0.068 J**		
Vanadium	**46.28**	**2.3**	**21**	**13**	**22**	**23**			**10**	**7.5**		
Zinc	2200	**7.8**	**18**	**11**	**31**	**32**			**19**	**18**		
PCBs												
Aroclor 1016	0.41	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1221	0.2	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1232	0.17	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1242	0.23	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1248	0.23	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1254	0.12	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1260	0.24	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1262	0.24	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ
Aroclor 1268	0.24	< 0.0074 UJ	< 0.0072 U	< 0.0077 U	< 0.0080 U	< 0.0083 U	< 0.0073 U	< 0.0081 U	< 0.0092 U	< 0.010 U	< 0.027 UJ	< 0.015 UJ

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
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N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
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VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H21	CH-AOC-H22	CH-AOC-H22	CH-AOC-H3	CH-AOC-H3	CH-AOC-H4	CH-AOC-H4	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5
	Location ID	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB02	H4-SB03	H5-SS01	H5-SS02	H5-SS03	H5-SS04
	Sample Date	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016
	Depth Interval	5 - 6 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
1,2-Dichlorobenzene	100	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
1,3-Dichlorobenzene	17	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
1,4-Dichlorobenzene	2.6	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
1-Methylnaphthalene	18	**0.011 J+**	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
2,4,5-Trichlorophenol	630	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
2,4,6-Trichlorophenol	6.3	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
2,4-Dichlorophenol	19	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
2,4-Dimethylphenol	130	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
2,4-Dinitrophenol	13	< 0.18 U	< 0.54 U	< 0.19 U	< 0.20 UJ	< 0.21 UJ			< 0.22 U	< 0.76 UJ		
2,4-Dinitrotoluene	1.7	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
2,6-Dinitrotoluene	0.36	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
2-Chloronaphthalene	480	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
2-Chlorophenol	39	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
2-Methylnaphthalene	24	**0.012 J+**	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
2-Methylphenol	100	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 U		
2-Nitroaniline	63	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
2-Nitrophenol	13	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
3,3-Dichlorobenzidine	1.2	< 0.73 U	< 2.1 U	< 0.77 U	< 0.80 U	< 0.83 U			< 0.90 UJ	< 3.0 UJ		
3,4-Methylphenol	NE	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 U		
3-Nitroaniline	63	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
4,6-Dinitro-2-methylphenol	0.51	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
4-Bromophenyl-phenylether	NE	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
4-Chloro-3-methylphenol	630	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
4-Chloroaniline	2.7	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 U		
4-Chlorophenyl-phenylether	NE	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
4-Nitroaniline	25	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
4-Nitrophenol	13	< 0.37 U	< 1.1 U	< 0.38 U	< 0.40 U	< 0.41 U			< 0.45 U	< 1.5 UJ		
Acenaphthene	100	< 0.0022 U	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
Acenaphthylene	100	< 0.0022 U	< 0.0022 U	**0.0026**	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
Anthracene	100	< 0.0022 U	< 0.0022 U	**0.0046**	< 0.00080 U	< 0.00084 U			< 0.00090 U	**0.0016**		
Benzo(a)anthracene	**1**	**0.013 J+**	**0.0044**	**0.015**	**0.0016**	**0.0039**			**0.0012**	< 0.0010 U		
Benzo(a)pyrene	**0.115**	**0.0031 J+**	**0.0044**	**0.015**	**0.0014**	**0.0035**			< 0.00090 U	**0.0013**		
Benzo(b)fluoranthene	**1**	**0.022 J+**	**0.010**	**0.027**	**0.0035**	**0.0064**			< 0.00090 U	**0.0020**		
Benzo(g,h,i)perylene	100	**0.0051 J+**	< 0.0022 U	< 0.0023 U	< 0.00080 U	**0.0024 J+**			< 0.00090 U	< 0.0010 U		
Benzo(k)fluoranthene	**1**	**0.0053 J+**	**0.0023**	**0.012**	< 0.00080 U	**0.0023**			< 0.00090 U	< 0.0010 U		
Benzoic acid	25000	**0.76 J**	< 1.1 UJ	< 0.38 UJ	**0.27 J**	**0.31 J**			< 0.45 U	< 1.5 UJ		
Benzyl Alcohol	630	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Bis(2-chloro-1-methylethyl) ether	310	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Bis(2-chloroethoxy)methane	19	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	**0.034 J**			< 0.022 U	< 0.076 UJ		
Bis(2-chloroethyl)ether	0.23	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
Bis(2-ethylhexyl)phthalate	39	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
Butyl benzyl phthalate	290	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
CARBAZOLE	240	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Chrysene	**1**	**0.011 J+**	**0.0054**	**0.016**	**0.0018**	**0.0032**			< 0.00090 U	**0.0010**		
Dibenz(a,h)anthracene	**0.115**	< 0.0022 U	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		

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Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-H21	CH-AOC-H22	CH-AOC-H22	CH-AOC-H3	CH-AOC-H3	CH-AOC-H4	CH-AOC-H4	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5	CH-AOC-H5
	Location ID	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB02	H4-SB03	H5-SS01	H5-SS02	H5-SS03	H5-SS04
	Sample Date	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016
	Depth Interval	5 - 6 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Dibenzofuran	**7.3**	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Diethyl phthalate	5100	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Dimethyl phthalate	5100	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Di-n-butyl phthalate	630	< 0.037 U	< 0.11 U	< 0.038 U	< 0.040 U	< 0.041 U			< 0.045 U	< 0.15 UJ		
Di-n-octyl phthalate	63	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Fluoranthene	100	**0.025 J+**	**0.010**	**0.027**	**0.0037**	**0.0074**			< 0.00090 U	< 0.0010 U		
Fluorene	100	< 0.0022 U	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
Hexachlorobenzene	0.21	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Hexachlorobutadiene	1.2	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Hexachloroethane	1.8	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Indeno(1,2,3-cd)pyrene	**0.5**	**0.0051 J+**	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
Isophorone	570	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Naphthalene	3.8	**0.014 J+**	< 0.0022 U	< 0.0023 U	< 0.00080 U	< 0.00084 U			< 0.00090 U	< 0.0010 U		
Nitrobenzene	5.1	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
n-Nitrosodimethylamine	0.002	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
n-Nitroso-di-n-propylamine	0.078	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
n-Nitrosodiphenylamine	110	< 0.018 U	< 0.054 U	< 0.019 U	< 0.020 U	< 0.021 U			< 0.022 U	< 0.076 UJ		
Pentachlorophenol	1	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
Phenanthrene	100	**0.012 J+**	**0.0029**	**0.0078**	**0.0018**	**0.0044**			< 0.00090 U	**0.0016**		
Phenol	100	< 0.092 U	< 0.27 U	< 0.096 U	< 0.10 U	< 0.10 U			< 0.11 U	< 0.38 UJ		
Pyrene	100	**0.028 J+**	**0.0087**	**0.023**	**0.0027**	**0.0071**			< 0.00090 U	**0.0018**		
Total BaP PAHs Calculated	**0.115**	**0.00937**	**0.00829**	**0.0219**	**0.00280**	**0.00548**			**0.00211**	**0.00271**		
VOCs												
1,1,1,2-Tetrachloroethane	2	< 0.073 UJ	< 0.069 UJ	< 0.075 UJ	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,1,1-Trichloroethane	100	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,1,2,2-Tetrachloroethane	0.6	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,1,2-Trichloroethane	0.15	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,1-Dichloroethane	3.6	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,1-Dichloroethene	23	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,2,3-Trichloropropane	0.0051	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,2,4-Trimethylbenzene	5.8											
1,2-Dibromo-3-chloropropane	0.0053	< 0.12 U	< 0.12 U	< 0.12 U	< 0.0032 U	< 0.0025 U			< 0.21 U	< 0.57 U		
1,2-Dibromoethane	0.036	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,2-Dichloroethane	0.46	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,2-Dichloropropane	1	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
1,3,5-Trimethylbenzene	47											
2-Butanone	100	< 0.61 U	< 0.58 U	< 0.62 U	< 0.016 U	< 0.013 U			< 0.53 U	< 1.4 U		
2-Hexanone	20	< 0.073 U	< 0.069 U	< 0.075 U	< 0.0032 U	< 0.0025 U			< 0.11 U	< 0.29 U		
4-Isopropyltoluene	190											
Acetone	100	**0.21 J**	< 0.46 U	< 0.50 U	**0.22 J+**	**0.13 J+**			< 0.21 U	< 0.57 U		
Benzene	1.2	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Bromodichloromethane	0.29	< 0.073 UJ	< 0.069 UJ	< 0.075 UJ	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Bromoform	19	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 UJ	< 0.00075 UJ			< 0.063 UJ	< 0.17 UJ		
Carbon disulfide	77	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Carbon tetrachloride	0.65	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		

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Camp Hero Remedial Investigation
Montauk, New York

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	Location ID	H21-SB03	H22-SS01	H22-SS02	H3-SS01	H3-SS02	H4-SB02	H4-SB03	H5-SS01	H5-SS02	H5-SS03	H5-SS04
	Sample Date	6/14/2016	6/15/2016	6/15/2016	6/7/2016	6/7/2016	6/12/2016	6/12/2016	6/13/2016	6/13/2016	6/13/2016	6/13/2016
	Depth Interval	5 - 6 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	4 - 5 ft	4 - 5 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Chlorobenzene	28	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Chloroethane	1400	< 0.49 UJ	< 0.46 UJ	< 0.50 UJ	< 0.0016 U	< 0.0013 U			< 0.21 U	< 0.57 U		
Chloroform	0.32	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Chloromethane	11	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
cis-1,2-Dichloroethene	16	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
cis-1,3-Dichloropropene	NE	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Dibromochloromethane	8.3	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Dichlorodifluoromethane	8.7	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.21 U	< 0.57 U		
Ethylbenzene	5.8	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Isopropylbenzene	190											
Methyl tert-butyl ether	47											
Methylene chloride	35	< 0.073 U	**0.060 J**	**0.073 J**	< 0.0032 U	< 0.0025 U			< 0.11 U	< 0.29 U		
Naphthalene	3.8											
n-Butylbenzene	100											
n-Propylbenzene	100											
sec-Butylbenzene	100											
Styrene	600	< 0.073 UJ	< 0.069 UJ	< 0.075 UJ	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
tert-Butylbenzene	100											
Tetrachloroethene	5.5	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Toluene	100	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
trans-1,2-Dichloroethene	100	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
trans-1,3-Dichloropropene	1.8	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Trichloroethene	0.41	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Trichlorofluoromethane	2300	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Vinyl Acetate	91	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Vinyl chloride	0.059	< 0.073 U	< 0.069 U	< 0.075 U	< 0.00097 U	< 0.00075 U			< 0.063 U	< 0.17 U		
Xylenes (total)	58	< 0.18 U	< 0.17 U	< 0.19 U	< 0.0029 U	< 0.0023 U			< 0.19 U	< 0.51 U		

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-P113	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	P113-SB01	P113-SB01	P113-SB02	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10	WDS-SB11
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/13/2016	6/13/2016	6/12/2016	6/13/2016
	Depth Interval	3 - 4 ft	4 - 5 ft	3 - 4 ft	1 - 2 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220											
1,3-Dinitrobenzene	0.63											
2,4,6-Trinitrotoluene	3.6											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Amino-4,6-dinitrotoluene	15											
2-Nitrotoluene	3.2											
3-Nitrotoluene	0.63											
4-Amino-2,6-Dinitro Toluene	15											
4-Nitrotoluene	25											
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1											
Methyl-2,4,6-trinitrophenylnitramine	16											
Nitrobenzene	5.1											
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390											
Metals												
Aluminum	27822				**5800**	**7100**	**10000**	**13000**	**13000**	**11000**	**7300**	**13000**
Antimony	10.3				**1.9**	**1.8**	**2.3**	**4.4**	**2.0**	**2.7**	**2.7**	**2.9**
Arsenic	**3.383**				**1.2 J**	**1.4 J**	**1.6**	**1.5 J**	**1.7**	**0.69 J**	**1.1 J**	**1.7**
Barium	350				**24**	**19**	**24**	**42**	**21**	**29**	**21**	**28**
Beryllium	14				**0.033 J**	**0.065 J**	**0.063 J**	**2.3**	**0.080 J**	**0.15 J**	< 0.037 U	**0.071 J**
Cadmium	2.5				**0.082 J**	**0.061 J**	< 0.037 U	**1.8**	**0.071 J**	< 0.037 U	< 0.037 U	< 0.036 U
Calcium (Ca)	**751.8**				**1000**	**1100**	**740**	**1400**	**2600**	**1000**	**650**	**750**
Chromium	**33.92**				**7.4**	**11**	**13**	**15**	**12**	**15**	**9.7**	**15**
Cobalt	10.24				**2.1**	**2.0**	**2.5**	**4.5**	**1.9**	**2.7**	**2.9**	**2.9**
Copper	270				**22**	**20**	**27**	**24**	**28**	**24**	**24**	**22**
Iron (Fe)	**19000**				**8300**	**7200**	**11000**	**8100**	**12000**	**8200**	**9200**	**7000**
Lead	400	**4.6**	**3.1 J**	**2.2 J**	**12**	**5.6**	**3.8**	**9.6**	**7.7**	**2.9 J**	**2.1 J**	**3.6**
Magnesium (Mg)	8315				**1100**	**1100**	**1600**	**1700**	**910**	**2100**	**1200**	**2300**
Manganese (Mn)	656.8				**130**	**90**	**100**	**96**	**120**	**110**	**150**	**120**
Nickel	140				**4.7**	**4.9**	**6.7**	**10**	**4.0 J**	**7.5**	**4.9**	**9.3**
Potassium (K)	NE				**640**	**440**	**680**	**880**	**440**	**1100**	**800**	**1200**
Selenium	36				< 1.0 U	< 1.2 U	< 1.1 U	< 1.4 U	< 1.3 U	< 1.1 U	< 1.1 U	< 1.1 U
Silver	36				< 0.17 U	< 0.19 U	< 0.18 U	**2.7**	< 0.22 U	< 0.18 U	< 0.19 U	< 0.18 U
Sodium (Na)	**320**				**68**	**110**	**89**	**130**	**59**	**100**	**78**	**100**
Thallium	0.414				**0.068 J**	**0.067 J**	**0.18**	**0.089 J**	**0.10 J**	**0.091 J**	**0.087 J**	**0.10 J**
Vanadium	**46.28**				**13**	**15**	**22**	**17**	**22**	**17**	**14**	**18**
Zinc	2200				**23**	**14**	**14**	**37**	**17**	**17**	**10**	**21**
PCBs												
Aroclor 1016	0.41				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1221	0.2				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1232	0.17				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1242	0.23				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1248	0.23				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1254	0.12				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1260	0.24				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1262	0.24				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U
Aroclor 1268	0.24				< 0.0073 UJ	< 0.0077 U	< 0.0075 U	< 0.0091 U	< 0.0086 U	< 0.0074 U	< 0.0073 U	< 0.0073 U

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-P113	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	P113-SB01	P113-SB01	P113-SB02	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10	WDS-SB11
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/13/2016	6/13/2016	6/12/2016	6/13/2016
	Depth Interval	3 - 4 ft	4 - 5 ft	3 - 4 ft	1 - 2 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
1,2-Dichlorobenzene	100				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
1,3-Dichlorobenzene	17				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
1,4-Dichlorobenzene	2.6				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
1-Methylnaphthalene	18				**0.085**	< 0.0078 U	**1.7 J+**	**0.0050 J+**	< 0.00088 U	**0.0077**	< 0.00074 U	< 0.00074 U
2,4,5-Trichlorophenol	630				< 0.036 U	< 0.038 U	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 U	< 0.036 U
2,4,6-Trichlorophenol	6.3				< 0.036 U	< 0.038 U	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 U	< 0.036 U
2,4-Dichlorophenol	19				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
2,4-Dimethylphenol	130				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
2,4-Dinitrophenol	13				< 0.18 U	< 0.19 U	< 0.18 U	< 0.22 U	< 0.22 U	< 0.19 U	< 0.18 U	< 0.18 U
2,4-Dinitrotoluene	1.7				**0.028 J**	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
2,6-Dinitrotoluene	0.36				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
2-Chloronaphthalene	480				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
2-Chlorophenol	39				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
2-Methylnaphthalene	24				**0.063**	**0.0088**	**2.0 J+**	**0.0055**	**0.0027**	**0.0081**	< 0.00074 U	< 0.00074 U
2-Methylphenol	100				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
2-Nitroaniline	63				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
2-Nitrophenol	13				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
3,3-Dichlorobenzidine	1.2				< 0.72 U	< 0.76 U	< 0.74 U	< 0.89 U	< 0.87 UJ	< 0.76 UJ	< 0.73 UJ	< 0.72 UJ
3,4-Methylphenol	NE				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
3-Nitroaniline	63				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
4,6-Dinitro-2-methylphenol	0.51				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
4-Bromophenyl-phenylether	NE				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 UJ	< 0.091 U
4-Chloro-3-methylphenol	630				< 0.036 U	< 0.038 U	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 U	< 0.036 U
4-Chloroaniline	2.7				< 0.090 U	< 0.095 U	**0.71**	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
4-Chlorophenyl-phenylether	NE				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
4-Nitroaniline	25				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 UJ	< 0.091 U
4-Nitrophenol	13				< 0.36 U	< 0.38 U	< 0.37 U	< 0.45 U	< 0.43 U	< 0.38 U	< 0.37 U	< 0.36 U
Acenaphthene	100	< 0.00082 U	< 0.00077 U	< 0.00077 U	**0.47**	**0.015**	**7.6 J+**	< 0.0027 U	**0.0045 J**	**0.035**	< 0.00074 U	< 0.00074 U
Acenaphthylene	100	< 0.00082 U	< 0.00077 U	< 0.00077 U	< 0.036 U	**0.011**	**0.26 J+**	< 0.0027 U	**0.0050 J**	**0.0021**	< 0.00074 U	< 0.00074 U
Anthracene	100	< 0.00082 U	< 0.00077 U	< 0.00077 U	**1.2**	**0.041**	**10 J+**	< 0.0027 U	**0.043 J**	**0.12**	< 0.00074 U	< 0.00074 U
Benzo(a)anthracene	**1**	< 0.00082 U	**0.00085**	< 0.00077 U	**2.7**	**0.21**	**170 J+**	**0.0051**	**0.025 J**	**0.19**	< 0.00074 U	< 0.00074 U
Benzo(a)pyrene	**0.115**	< 0.00082 U	< 0.00077 U	< 0.00077 U	**2.2**	**0.17**	**8.8 J+**	**0.0059**	**0.041 J**	**0.14**	< 0.00074 U	< 0.00074 U
Benzo(b)fluoranthene	**1**	< 0.00082 U	**0.0019**	< 0.00077 U	**3.2**	**0.25**	**16 J+**	**0.011**	**0.031 J**	**0.21**	< 0.00074 U	< 0.00074 U
Benzo(g,h,i)perylene	100	< 0.00082 U	< 0.00077 U	< 0.00077 U	**0.75**	**0.083**	**2.9 J+**	**0.0030**	**0.020 J**	**0.038**	< 0.00074 U	< 0.00074 U
Benzo(k)fluoranthene	**1**	< 0.00082 U	< 0.00077 U	< 0.00077 U	**0.96**	**0.12**	**0.049 J+**	**0.0030**	**0.025 J**	**0.064**	< 0.00074 U	< 0.00074 U
Benzoic acid	25000				< 0.36 UJ	< 0.38 UJ	< 0.37 U	< 0.45 UJ	< 0.43 U	< 0.38 U	< 0.37 U	< 0.36 U
Benzyl Alcohol	630				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Bis(2-chloro-1-methylethyl) ether	310				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Bis(2-chloroethoxy)methane	19				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Bis(2-chloroethyl)ether	0.23				< 0.036 U	< 0.038 U	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 UJ	< 0.036 U
Bis(2-ethylhexyl)phthalate	39				< 0.036 U	**0.048 J**	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 UJ	< 0.036 U
Butyl benzyl phthalate	290				< 0.036 U	**0.089 J**	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 UJ	< 0.036 U
CARBAZOLE	240				**0.41**	**0.022 J**	**9.7 J-**	< 0.022 U	< 0.022 U	**0.028 J**	< 0.018 UJ	< 0.018 U
Chrysene	**1**	< 0.00082 U	< 0.00077 U	< 0.00077 U	**2.2**	**0.17**	**20 J+**	**0.0041**	**0.024 J**	**0.14**	< 0.00074 U	< 0.00074 U
Dibenz(a,h)anthracene	**0.115**	< 0.00082 U	< 0.00077 U	< 0.00077 U	**0.19**	< 0.0078 U	**1.7 J+**	< 0.0027 U	**0.0012 J**	**0.038**	< 0.00074 U	< 0.00074 U

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	Location ID	P113-SB01	P113-SB01	P113-SB02	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10	WDS-SB11
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/13/2016	6/13/2016	6/12/2016	6/13/2016
	Depth Interval	3 - 4 ft	4 - 5 ft	3 - 4 ft	1 - 2 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Dibenzofuran	**7.3**				**0.19**	< 0.019 U	**11 J-**	< 0.022 U	< 0.022 U	**0.027 J**	< 0.018 UJ	< 0.018 U
Diethyl phthalate	5100				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Dimethyl phthalate	5100				< 0.018 U	**0.094 J**	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Di-n-butyl phthalate	630				**0.027 J**	**0.035 J**	< 0.037 U	< 0.045 U	< 0.043 U	< 0.038 U	< 0.037 UJ	< 0.036 U
Di-n-octyl phthalate	63				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Fluoranthene	100	< 0.00082 U	**0.0013**	< 0.00077 U	**5.9**	**0.24**	**23 J+**	**0.0090**	**0.048 J**	**0.42**	< 0.00074 U	< 0.00074 U
Fluorene	100	< 0.00082 U	< 0.00077 U	< 0.00077 U	**0.55**	**0.015**	**9.7 J+**	< 0.0027 U	**0.0048 J**	**0.048**	< 0.00074 U	< 0.00074 U
Hexachlorobenzene	0.21				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Hexachlorobutadiene	1.2				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Hexachloroethane	1.8				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Indeno(1,2,3-cd)pyrene	**0.5**	< 0.00082 U	< 0.00077 U	< 0.00077 U	**1.0**	**0.083**	**2.9 J+**	**0.0036**	**0.019 J**	**0.052**	< 0.00074 U	< 0.00074 U
Isophorone	570				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Naphthalene	3.8				**0.096**	**0.010**	**1.9 J+**	**0.0046**	**0.0028**	**0.0088**	< 0.00074 U	< 0.00074 U
Nitrobenzene	5.1				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
n-Nitrosodimethylamine	0.002				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
n-Nitroso-di-n-propylamine	0.078				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
n-Nitrosodiphenylamine	110				< 0.018 U	< 0.019 U	< 0.018 U	< 0.022 U	< 0.022 U	< 0.019 U	< 0.018 UJ	< 0.018 U
Pentachlorophenol	1				< 0.090 U	< 0.095 U	< 0.092 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
Phenanthrene	100	< 0.00082 U	**0.0011**	< 0.00077 U	**3.9**	**0.20**	**22 J+**	**0.0032**	**0.042 J**	**0.31**	< 0.00074 U	< 0.00074 U
Phenol	100				< 0.090 U	< 0.095 U	**0.042 J**	< 0.11 U	< 0.11 U	< 0.094 U	< 0.092 U	< 0.091 U
Pyrene	100	< 0.00082 U	**0.0019**	< 0.00077 U	**4.5**	**0.34**	**99 J+**	**0.0077**	**0.043 J**	**0.32**	< 0.00074 U	< 0.00074 U
Total BaP PAHs Calculated	**0.115**	**0.00190**	**0.00190**	**0.00178**	**3.09**	**0.233**	**29.4**	**0.0106**	**0.0500**	**0.224**	**0.00171**	**0.00171**
VOCs												
1,1,1,2-Tetrachloroethane	2				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,1,1-Trichloroethane	100				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,1,2,2-Tetrachloroethane	0.6				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,1,2-Trichloroethane	0.15				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,1-Dichloroethane	3.6				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,1-Dichloroethene	23				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,2,3-Trichloropropane	0.0051				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,2,4-Trimethylbenzene	5.8	< 0.0010 U	< 0.00098 U	< 0.00059 U								
1,2-Dibromo-3-chloropropane	0.0053				< 0.0024 U	< 0.0022 U	< 0.0021 U	< 0.0022 U	< 0.22 U	< 0.0020 U	< 0.0017 U	< 0.0017 U
1,2-Dibromoethane	0.036				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,2-Dichloroethane	0.46				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,2-Dichloropropane	1				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
1,3,5-Trimethylbenzene	47	< 0.0010 U	< 0.00098 U	< 0.00059 U								
2-Butanone	100				**0.0080 J**	**0.013 J**	< 0.011 U	**0.014 J**	< 0.54 U	< 0.010 U	< 0.0086 U	< 0.0085 U
2-Hexanone	20				< 0.0024 U	< 0.0022 U	< 0.0021 U	< 0.0022 U	< 0.11 U	< 0.0020 U	< 0.0017 U	< 0.0017 U
4-Isopropyltoluene	190	< 0.0010 U	< 0.00098 U	< 0.00059 U								
Acetone	100				< 0.0024 UJ	**0.097 J+**	**0.12 J+**	**0.22 J+**	< 0.22 U	< 0.0020 UJ	< 0.0017 UJ	< 0.0017 UJ
Benzene	1.2	< 0.0010 U	< 0.00098 U	< 0.00059 U	< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Bromodichloromethane	0.29				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Bromoform	19				< 0.00073 UJ	< 0.00067 UJ	< 0.00063 UJ	< 0.00067 UJ	< 0.065 UJ	< 0.00060 UJ	< 0.00052 UJ	< 0.00051 UJ
Carbon disulfide	77				< 0.00073 U	**0.00094 J**	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Carbon tetrachloride	0.65				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U

Notes:
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ft - feet.
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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
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VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-P113	CH-AOC-P113	CH-AOC-P113	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	P113-SB01	P113-SB01	P113-SB02	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10	WDS-SB11
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/13/2016	6/13/2016	6/12/2016	6/13/2016
	Depth Interval	3 - 4 ft	4 - 5 ft	3 - 4 ft	1 - 2 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
Chlorobenzene	28				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Chloroethane	1400				< 0.0012 U	< 0.0011 U	< 0.0011 U	< 0.0011 U	< 0.22 U	< 0.0010 U	< 0.00086 U	< 0.00085 U
Chloroform	0.32				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Chloromethane	11				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
cis-1,2-Dichloroethene	16				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
cis-1,3-Dichloropropene	NE				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Dibromochloromethane	8.3				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 UJ	< 0.00052 UJ	< 0.00051 UJ
Dichlorodifluoromethane	8.7				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.22 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Ethylbenzene	5.8	< 0.0010 U	< 0.00098 U	< 0.00059 U	< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Isopropylbenzene	190	< 0.0010 U	< 0.00098 U	< 0.00059 U								
Methyl tert-butyl ether	47	< 0.0010 U	< 0.00098 U	< 0.00059 U								
Methylene chloride	35				< 0.0024 U	< 0.0022 U	< 0.0021 U	< 0.0022 U	< 0.11 U	< 0.0020 U	< 0.0017 UJ	< 0.0017 U
Naphthalene	3.8	< 0.0010 U	< 0.00098 U	< 0.00059 U								
n-Butylbenzene	100	< 0.0010 U	< 0.00098 U	< 0.00059 U								
n-Propylbenzene	100	< 0.0010 U	< 0.00098 U	< 0.00059 U								
sec-Butylbenzene	100	< 0.0017 U	< 0.0016 U	< 0.00099 U								
Styrene	600				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
tert-Butylbenzene	100	< 0.0010 U	< 0.00098 U	< 0.00059 U								
Tetrachloroethene	5.5				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Toluene	100	< 0.0010 U	< 0.00098 U	< 0.00059 U	< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
trans-1,2-Dichloroethene	100				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
trans-1,3-Dichloropropene	1.8				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Trichloroethene	0.41				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Trichlorofluoromethane	2300				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Vinyl Acetate	91				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Vinyl chloride	0.059				< 0.00073 U	< 0.00067 U	< 0.00063 U	< 0.00067 U	< 0.065 U	< 0.00060 U	< 0.00052 U	< 0.00051 U
Xylenes (total)	58	< 0.0031 U	< 0.0029 U	< 0.0018 U	< 0.0022 U	< 0.0020 U	< 0.0019 U	< 0.0020 U	< 0.19 U	< 0.0018 U	< 0.0016 U	< 0.0015 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
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VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	WDS-SB12	WDS-SB13	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB27	WDS-SB27
	Sample Date	6/13/2016	6/13/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	3 - 4 ft	7 - 8 ft	4 - 5 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220											
1,3-Dinitrobenzene	0.63											
2,4,6-Trinitrotoluene	3.6											
2,4-Dinitrotoluene	1.7											
2,6-Dinitrotoluene	0.36											
2-Amino-4,6-dinitrotoluene	15											
2-Nitrotoluene	3.2											
3-Nitrotoluene	0.63											
4-Amino-2,6-Dinitro Toluene	15											
4-Nitrotoluene	25											
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1											
Methyl-2,4,6-trinitrophenylnitramine	16											
Nitrobenzene	5.1											
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	390											
Metals												
Aluminum	27822	9300	10000	15000	5300	8200	4500	26000	4100	17000	13000	13000
Antimony	10.3	2.2	2.5	4.6	2.3	3.0	2.6	5.4	5.0	6.9	2.4	1.9
Arsenic	**3.383**	1.7	1.4 J	2.2	1.9	2.0	**25**	2.9	**3.7**	**4.8**	1.4 J	1.4 J
Barium	350	17	18	51	10	23	24	120	32	65	22	24
Beryllium	14	< 0.036 U	0.15 J	0.35	0.23	0.31	0.57	0.83	0.62	0.48	0.38	0.39
Cadmium	2.5	0.033 J	0.049 J	0.027 J	0.027 J	0.046 J	0.46	0.17 J	0.048 J	0.30	0.045 J	0.035 J
Calcium (Ca)	**751.8**	490	520	**840**	330	480	460	**1600**	**870**	**1400**	**780**	720
Chromium	**33.92**	12	13	17	7.2	9.9	9.2	**36**	12	20	12	13
Cobalt	10.24	2.4	2.5	5.1	2.4	3.0	2.6	5.6	5.1	6.9	2.6	2.0
Copper	270	20	23	41	19	25	29	52	27	49	24	25
Iron (Fe)	**19000**	9200	8800	16000	8100	11000	13000	15000	4700	**23000**	10000	8400
Lead	400	2.8 J	4.5	3.9 J	1.6 J	2.6 J	4.2	6.6	3.9	38	3.9 J	4.9
Magnesium (Mg)	8315	1200	1700	3600	820	1400	940	5800	1000	3400	1300	1200
Manganese (Mn)	656.8	90	87	330	86	270	84	250	330	320	110	98
Nickel	140	5.6	6.8	14	5.5	7.2	5.9	22	9.7	11	7.4	6.7
Potassium (K)	NE	400	560	2400	470	840	670	3200	850	2000	610	640
Selenium	36	< 1.1 U	< 1.1 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.3 U
Silver	36	< 0.18 U	< 0.18 U	< 0.20 U	< 0.18 U	< 0.19 U	0.18 J	< 0.21 U	< 0.19 U	< 0.20 U	< 0.20 U	< 0.21 U
Sodium (Na)	**320**	65	67	120	47	54	74	210	100	160	95	100
Thallium	0.414	0.076 J	0.073 J	0.16	0.052 J	0.081 J	0.14 J	0.41	0.11 J	0.15 J	0.082 J	0.13 J
Vanadium	**46.28**	17	18	29	11	18	22	**51**	24	29	18	21
Zinc	2200	11	13	24	7.1	13	12	50	19	41	15	16
PCBs												
Aroclor 1016	0.41	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1221	0.2	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1232	0.17	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1242	0.23	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1248	0.23	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1254	0.12	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1260	0.24	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1262	0.24	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ
Aroclor 1268	0.24	< 0.0074 U	< 0.0075 U	< 0.0079 U	< 0.0072 U	< 0.0073 U	< 0.0079 U	< 0.0081 U	< 0.0077 U	< 0.0082 U	< 0.0084 U	< 0.0084 UJ

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	WDS-SB12	WDS-SB13	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB27	WDS-SB27
	Sample Date	6/13/2016	6/13/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	3 - 4 ft	7 - 8 ft	4 - 5 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
SVOCs												
1,2,4-Trichlorobenzene	5.8	< 0.018 U	< 0.018 U	< 0.020 U								
1,2-Dichlorobenzene	100	< 0.018 U	< 0.018 U	< 0.020 U								
1,3-Dichlorobenzene	17	< 0.018 U	< 0.018 U	< 0.020 U								
1,4-Dichlorobenzene	2.6	< 0.018 U	< 0.018 U	< 0.020 U								
1-Methylnaphthalene	18	< 0.00075 U	**0.015**	< 0.00080 U	< 0.00072 U	**0.0027**	**0.0024**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
2,4,5-Trichlorophenol	630	< 0.036 U	< 0.037 U	< 0.039 UJ								
2,4,6-Trichlorophenol	6.3	< 0.036 U	< 0.037 U	< 0.039 UJ								
2,4-Dichlorophenol	19	< 0.090 U	< 0.092 U	< 0.098 UJ								
2,4-Dimethylphenol	130	< 0.090 U	< 0.092 U	< 0.098 UJ								
2,4-Dinitrophenol	13	< 0.18 U	< 0.18 U	< 0.20 UJ								
2,4-Dinitrotoluene	1.7	< 0.018 U	< 0.018 U	< 0.020 U								
2,6-Dinitrotoluene	0.36	< 0.018 U	< 0.018 U	< 0.020 U								
2-Chloronaphthalene	480	< 0.018 U	< 0.018 U	< 0.020 U								
2-Chlorophenol	39	< 0.090 U	< 0.092 U	< 0.098 UJ								
2-Methylnaphthalene	24	< 0.00075 U	**0.013**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.0020**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
2-Methylphenol	100	< 0.090 U	< 0.092 U	< 0.098 U								
2-Nitroaniline	63	< 0.018 U	< 0.018 U	< 0.020 U								
2-Nitrophenol	13	< 0.090 U	< 0.092 U	< 0.098 UJ								
3,3-Dichlorobenzidine	1.2	< 0.72 UJ	< 0.74 UJ	< 0.78 U								
3,4-Methylphenol	NE	< 0.090 U	< 0.092 U	< 0.098 U								
3-Nitroaniline	63	< 0.018 U	< 0.018 U	< 0.020 U								
4,6-Dinitro-2-methylphenol	0.51	< 0.090 U	< 0.092 U	< 0.098 UJ								
4-Bromophenyl-phenylether	NE	< 0.090 U	< 0.092 U	< 0.098 U								
4-Chloro-3-methylphenol	630	< 0.036 U	< 0.037 U	< 0.039 UJ								
4-Chloroaniline	2.7	< 0.090 U	< 0.092 U	< 0.098 U								
4-Chlorophenyl-phenylether	NE	< 0.018 U	< 0.018 U	< 0.020 U								
4-Nitroaniline	25	< 0.090 U	< 0.092 U	< 0.098 U								
4-Nitrophenol	13	< 0.36 U	< 0.37 U	< 0.39 UJ								
Acenaphthene	100	< 0.00075 U	**0.12**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.012**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Acenaphthylene	100	< 0.00075 U	**0.016**	< 0.00080 U	< 0.00072 U	**0.00095**	**0.0012**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Anthracene	100	**0.0012**	**0.58**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.036**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Benzo(a)anthracene	**1**	**0.014**	**1.8**	< 0.00080 U	< 0.00072 U	**0.0019**	**0.099**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Benzo(a)pyrene	**0.115**	**0.013**	**1.3**	< 0.00080 U	< 0.00072 U	**0.0013**	**0.060**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Benzo(b)fluoranthene	**1**	**0.030**	**1.9**	< 0.00080 U	< 0.00072 U	**0.0032**	**0.095**	< 0.00082 U	< 0.00078 U	< 0.00082 U	**0.0015 J**	< 0.00084 UJ
Benzo(g,h,i)perylene	100	**0.0064**	**0.44**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.014**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Benzo(k)fluoranthene	**1**	**0.0041**	**0.54**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.021**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Benzoic acid	25000	< 0.36 U	< 0.37 U	< 0.39 UJ								
Benzyl Alcohol	630	< 0.018 U	< 0.018 U	< 0.020 U								
Bis(2-chloro-1-methylethyl) ether	310	< 0.018 U	< 0.018 U	< 0.020 U								
Bis(2-chloroethoxy)methane	19	< 0.018 U	< 0.018 U	< 0.020 U								
Bis(2-chloroethyl)ether	0.23	< 0.036 U	< 0.037 U	< 0.039 U								
Bis(2-ethylhexyl)phthalate	39	< 0.036 U	< 0.037 U	< 0.039 U								
Butyl benzyl phthalate	290	< 0.036 U	< 0.037 U	< 0.039 U								
CARBAZOLE	240	< 0.018 U	**0.42**	< 0.020 U								
Chrysene	**1**	**0.0095**	**1.2**	< 0.00080 U	< 0.00072 U	**0.0015**	**0.050**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Dibenz(a,h)anthracene	**0.115**	**0.0013**	< 0.074 U	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.0047**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 8
Preliminary Screening of Subsurface Soil Results at AOCs without Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
	Location ID	WDS-SB12	WDS-SB13	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB27	WDS-SB27
	Sample Date	6/13/2016	6/13/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	3 - 4 ft	7 - 8 ft	4 - 5 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Dibenzofuran	**7.3**	< 0.018 U	**0.20**	< 0.020 U								
Diethyl phthalate	5100	< 0.018 U	< 0.018 U	< 0.020 U								
Dimethyl phthalate	5100	< 0.018 U	< 0.018 U	< 0.020 U								
Di-n-butyl phthalate	630	< 0.036 U	< 0.037 U	< 0.039 U								
Di-n-octyl phthalate	63	< 0.018 U	< 0.018 U	< 0.020 U								
Fluoranthene	100	**0.019**	**3.5**	< 0.00080 U	< 0.00072 U	**0.0026**	**0.17**	< 0.00082 U	< 0.00078 U	< 0.00082 U	**0.0012 J**	< 0.00084 UJ
Fluorene	100	< 0.00075 U	**0.16**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.012**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Hexachlorobenzene	0.21	< 0.018 U	< 0.018 U	< 0.020 U								
Hexachlorobutadiene	1.2	< 0.018 U	< 0.018 U	< 0.020 U								
Hexachloroethane	1.8	< 0.018 U	< 0.018 U	< 0.020 U								
Indeno(1,2,3-cd)pyrene	**0.5**	**0.0054**	**0.54**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.015**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Isophorone	570	< 0.018 U	< 0.018 U	< 0.020 U								
Naphthalene	3.8	< 0.00075 U	**0.015**	< 0.00080 U	< 0.00072 U	**0.00090**	**0.0025**	**0.00094**	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Nitrobenzene	5.1	< 0.018 U	< 0.018 U	< 0.020 U								
n-Nitrosodimethylamine	0.002	< 0.018 U	< 0.018 U	< 0.020 U								
n-Nitroso-di-n-propylamine	0.078	< 0.018 U	< 0.018 U	< 0.020 U								
n-Nitrosodiphenylamine	110	< 0.018 U	< 0.018 U	< 0.020 U								
Pentachlorophenol	1	< 0.090 U	< 0.092 U	< 0.098 UJ								
Phenanthrene	100	**0.0084**	**2.1**	< 0.00080 U	< 0.00072 U	< 0.00075 U	**0.15**	< 0.00082 U	< 0.00078 U	< 0.00082 U	< 0.00085 U	< 0.00084 U
Phenol	100	< 0.090 U	< 0.092 U	< 0.098 UJ								
Pyrene	100	**0.021**	**2.7**	< 0.00080 U	< 0.00072 U	**0.0020**	**0.15**	**0.0010**	< 0.00078 U	< 0.00082 U	**0.0012 J**	< 0.00084 UJ
Total BaP PAHs Calculated	**0.115**	**0.0193**	**1.80**	**0.00185**	**0.00166**	**0.00264**	**0.0859**	**0.00190**	**0.00180**	**0.00190**	**0.00203**	**0.00194**
VOCs												
1,1,1,2-Tetrachloroethane	2	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 UJ	< 0.062 UJ	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 UJ
1,1,1-Trichloroethane	100	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,1,2,2-Tetrachloroethane	0.6	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,1,2-Trichloroethane	0.15	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,1-Dichloroethane	3.6	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,1-Dichloroethene	23	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,2,3-Trichloropropane	0.0051	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,2,4-Trimethylbenzene	5.8											
1,2-Dibromo-3-chloropropane	0.0053	< 0.0020 U	< 0.0022 U	< 0.0017 U	< 0.17 U	< 0.21 U	< 0.44 U	< 0.0015 U	< 0.0019 U	< 0.0019 U	< 0.00098 U	< 0.68 U
1,2-Dibromoethane	0.036	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,2-Dichloroethane	0.46	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,2-Dichloropropane	1	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
1,3,5-Trimethylbenzene	47											
2-Butanone	100	**0.0070 J**	< 0.011 U	**0.0078 J**	< 0.41 U	< 0.51 U	**0.80 J**	**0.0092 J**	< 0.0095 U	< 0.0097 U	< 0.0049 U	< 1.7 U
2-Hexanone	20	< 0.0020 U	< 0.0022 U	< 0.0017 U	< 0.083 U	< 0.10 U	< 0.22 U	< 0.0015 U	< 0.0019 U	< 0.0019 U	< 0.00098 U	< 0.34 U
4-Isopropyltoluene	190											
Acetone	100	< 0.0020 UJ	< 0.0022 UJ	**0.12 J+**	< 0.17 U	**0.21 J**	**1.4**	< 0.0015 UJ	**0.15 J+**	< 0.0019 UJ	< 0.00098 UJ	< 0.68 U
Benzene	1.2	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Bromodichloromethane	0.29	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 UJ	< 0.062 UJ	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 UJ
Bromoform	19	< 0.00061 UJ	< 0.00067 UJ	< 0.00050 UJ	< 0.050 UJ	< 0.062 UJ	< 0.13 UJ	< 0.00044 UJ	< 0.00057 UJ	< 0.00058 UJ	< 0.00029 U	< 0.20 UJ
Carbon disulfide	77	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	**0.0052**	< 0.00057 U	< 0.00058 U	**0.00030 J**	< 0.20 U
Carbon tetrachloride	0.65	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U

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	Location ID	WDS-SB12	WDS-SB13	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB27	WDS-SB27
	Sample Date	6/13/2016	6/13/2016	6/15/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016	6/7/2016
	Depth Interval	4 - 5 ft	4 - 5 ft	5 - 6 ft	4 - 5 ft	4 - 5 ft	4 - 5 ft	3 - 4 ft	7 - 8 ft	4 - 5 ft	7 - 8 ft	7 - 8 ft
	Sample Type	N	N	N	N	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Chlorobenzene	28	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Chloroethane	1400	< 0.0010 U	< 0.0011 U	< 0.00083 U	< 0.17 U	< 0.21 U	< 0.44 U	< 0.00073 U	< 0.00095 U	< 0.00097 U	< 0.00049 U	< 0.68 U
Chloroform	0.32	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Chloromethane	11	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
cis-1,2-Dichloroethene	16	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
cis-1,3-Dichloropropene	NE	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 UJ	< 0.062 UJ	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 UJ
Dibromochloromethane	8.3	< 0.00061 UJ	< 0.00067 UJ	< 0.00050 U	< 0.050 UJ	< 0.062 UJ	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 UJ
Dichlorodifluoromethane	8.7	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.17 U	< 0.21 U	< 0.44 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.68 U
Ethylbenzene	5.8	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Isopropylbenzene	190											
Methyl tert-butyl ether	47											
Methylene chloride	35	< 0.0020 UJ	< 0.0022 UJ	< 0.0017 U	< 0.083 U	< 0.10 U	< 0.22 U	< 0.0015 U	< 0.0019 U	< 0.0019 U	< 0.00098 U	< 0.34 U
Naphthalene	3.8											
n-Butylbenzene	100											
n-Propylbenzene	100											
sec-Butylbenzene	100											
Styrene	600	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 UJ	< 0.062 UJ	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 UJ
tert-Butylbenzene	100											
Tetrachloroethene	5.5	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Toluene	100	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
trans-1,2-Dichloroethene	100	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
trans-1,3-Dichloropropene	1.8	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 UJ	< 0.062 UJ	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 UJ
Trichloroethene	0.41	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Trichlorofluoromethane	2300	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Vinyl Acetate	91	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Vinyl chloride	0.059	< 0.00061 U	< 0.00067 U	< 0.00050 U	< 0.050 U	< 0.062 U	< 0.13 U	< 0.00044 U	< 0.00057 U	< 0.00058 U	< 0.00029 U	< 0.20 U
Xylenes (total)	58	< 0.0018 U	< 0.0020 U	< 0.0015 U	< 0.15 U	< 0.18 U	< 0.40 U	< 0.0013 U	< 0.0017 U	< 0.0017 U	< 0.00088 U	< 0.61 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
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NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 4 for selected subsurface soil criteria without petroleum criteria.
SubSurface Criteria exceedances are highlighted and bolded

Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
	Location ID	203-SB01	203-SB02	203-SB03	203-SB03	203-SB05	203-SB06	203-SB22	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29
	Sample Date	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/15/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
	Depth Interval	9 - 10 ft	1 - 2 ft	3 - 4 ft	4 - 5 ft	4 - 5 ft	7 - 8 ft	9 - 10 ft	9 - 10 ft	9 - 10 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	8 - 9 ft	8 - 9 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**														
Explosives															
1,3,5-Trinitrobenzene	220														
1,3-Dinitrobenzene	0.63														
2,4,6-Trinitrotoluene	3.6														
2,4-Dinitrotoluene	1.7														
2,6-Dinitrotoluene	0.36														
2-Amino-4,6-dinitrotoluene	15														
2-Nitrotoluene	3.2														
3-Nitrotoluene	0.63														
4-Amino-2,6-Dinitro Toluene	15														
4-Nitrotoluene	25														
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1														
Methyl-2,4,6-trinitrophenylnitramine	16														
Nitrobenzene	3.7														
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocin	390														
Metals															
Aluminum	**27822**	6600	12000	9100	8900	12000	6570	20400	12800	**33500**	12200	9990	9750	10200	11400
Antimony	10.3	2.6	3.4	3.4	3.5	3.5	< 0.214 U	< 0.210 U	< 0.172 U	< 0.211 U	< 0.159 U	< 0.155 U	< 0.180 U	< 0.201 U	< 0.172 U
Arsenic	**3.383**	2.0	2.3	1.6	1.4	2.8	1.94	**4.94**	**3.82**	**9.29**	2.97	2.11	2.04	1.73	2.88
Barium	350	32	41	47	59	34	41.3	151	58.5	320	65.2	46.9	47.4	77.4	49.2
Beryllium	14	0.051 J	0.15 J	0.060 J	0.14 J	0.11 J	0.308	0.751	0.499	1.50	0.480	0.488	0.427	0.384	0.494
Cadmium	2.5	< 0.035 U	< 0.034 U	< 0.034 U	0.031 J	< 0.038 U	< 0.107 U	< 0.105 U	< 0.0859 U	0.0911 J	0.0327 J	< 0.0775 U	< 0.0899 U	< 0.100 U	< 0.0858 U
Calcium (Ca)	**751.8**	560	550	490	370	730	521	**1560**	536	**3210**	**8870**	**752**	381	647	532
Chromium	**33.92**	9.5	14	12	**220**	15	10.3	**35.3**	19.1	**67.0**	19.2	15.3	14.7	17.2	16.9
Chromium(III), Insoluble Salts	**36**						10.3	35.3	19.1	**67.0**	18.5	15.3	14.7	17.2	16.4
Chromium(VI)	**0.3**						< 0.44 U	< 0.46 UJ	< 0.44 UJ	< 0.55 UJ	**0.69 J-**	< 0.45 UJ	< 0.45 UJ	< 0.45 UJ	**0.45 J-**
Cobalt	**10.24**	2.7	3.4	3.5	3.4	3.7	2.76	**10.9**	6.47	**23.3**	5.75	4.07	4.65	5.71	5.14
Copper	270	27	37	31	34	31	5.80	22.1	11.8	48.5	12.4	9.80	9.23	5.13	10.4
Iron (Fe)	**19000**	11000	14000	13000	15000	12000	8660	**24000**	15100	**54300**	14700	13000	11400	15400	13500
Lead	400	1.7 J	2.3 J	1.8 J	3.0 J	4.0	3.30	6.62	4.63	14.8	5.14	4.27	3.42	3.48	5.31
Magnesium (Mg)	**8315**	1500	2900	2200	2000	2200	1610	7580	3610	**15200**	3900	2920	2700	4370	3110
Manganese (Mn)	**656.8**	210	170	240	390	110	134	400	244	**832**	218	201	145	290	223
Mercury	0.81						< 0.0179 U	< 0.0178 U	< 0.0174 U	< 0.0208 U	< 0.0185 U	< 0.0174 U	< 0.0169 U	< 0.0186 U	< 0.0170 U
Nickel	140	5.4	8.3	6.5	5.4	8.8	5.70	26.4	11.7	53.8	12.6	9.12	8.88	12.7	10.4
Potassium (K)	NE	1100	1900	1400	1500	1200	1250	5730	2560	12400	2560	2040	1780	4690	1940
Selenium	36	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 0.214 U	< 0.210 U	< 0.172 U	< 0.211 U	0.0924 J	< 0.155 U	< 0.180 U	< 0.201 U	0.0946 J
Silver	36	< 0.17 U	< 0.17 U	< 0.17 U	< 0.17 U	< 0.19 U	< 0.0535 U	< 0.0526 U	< 0.0429 U	0.0275 J	< 0.0397 U	< 0.0388 U	< 0.0449 U	< 0.0502 U	< 0.0429 U
Sodium (Na)	**320**	100	87	89	80	81	83.5 J	284	120	**621**	138	95.7	88.9	87.9	102
Thallium	**0.414**	0.13 J	0.12 J	0.17	0.11 J	0.16	0.117 J	0.330	0.169 J	**0.698**	0.194	0.172	0.126 J	0.275	0.156 J
Vanadium	**46.28**	16	22	17	18	23	17.1	**49.4**	28.6	**96.0**	28.7	24.4	22.0	23.4	25.3
Zinc	2200	12	19	16	16	20	16.0	59.2	31.2	117	30.4	24.8	22.3	31.1	27.9

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Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Location Group		CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID		203-SB01	203-SB02	203-SB03	203-SB03	203-SB05	203-SB06	203-SB22	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29
Sample Date		6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/15/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
Depth Interval		9 - 10 ft	1 - 2 ft	3 - 4 ft	4 - 5 ft	4 - 5 ft	7 - 8 ft	9 - 10 ft	9 - 10 ft	9 - 10 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	8 - 9 ft	8 - 9 ft
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
PCBs															
Aroclor 1016	0.41	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1221	0.2	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1232	0.17	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1242	0.23	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1248	0.23	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1254	0.12	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1260	0.24	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1262	0.24	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
Aroclor 1268	0.24	< 0.0072 U	< 0.0073 U	< 0.0070 U	< 0.0071 U	< 0.0076 U									
SVOCs															
1,2,4-Trichlorobenzene	5.8	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
1,2-Dichlorobenzene	100	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
1,3-Dichlorobenzene	17	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
1,4-Dichlorobenzene	2.6	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
1-Methylnaphthalene	**18**	0.0039	0.0095	0.015	0.0078	0.0090	**51**	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.00082 J	0.0021	2.5	5.5	0.19
2,4,5-Trichlorophenol	100	< 0.036 U	< 0.036 UJ	< 0.035 U	< 0.035 U	< 0.038 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2,4,6-Trichlorophenol	6.3	< 0.036 U	< 0.036 UJ	< 0.035 U	< 0.035 U	< 0.038 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2,4-Dichlorophenol	19	< 0.090 U	< 0.090 UJ	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2,4-Dimethylphenol	130	< 0.090 U	< 0.090 UJ	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2,4-Dinitrophenol	13	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.18 UJ	< 0.19 UJ	< 11 U	< 1.2 U	< 1.1 U	< 1.3 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
2,4-Dinitrotoluene	1.7	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.8 U	< 0.19 U	< 0.18 U	< 0.22 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
2,6-Dinitrotoluene	0.36	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2-Chloronaphthalene	480	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.018 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U
2-Chlorophenol	39	< 0.090 U	< 0.090 UJ	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2-Methylnaphthalene	**0.41**	0.0043	0.010	0.016	0.0084	0.0046	**76**	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0011 J	0.0028	**3.7**	**7.7**	0.082
2-Methylphenol	100	< 0.090 U	< 0.090 U	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2-Nitroaniline	63	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
2-Nitrophenol	13	< 0.090 U	< 0.090 UJ	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
3 or 4-Methylphenol	NE						< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
3,3-Dichlorobenzidine	1.2	< 0.72 UJ	< 0.72 UJ	< 0.70 UJ	< 0.71 UJ	< 0.76 UJ	< 3.6 U	< 0.39 U	< 0.36 U	< 0.45 U	< 0.39 U	< 0.37 U	< 0.36 U	< 0.37 U	< 0.36 U
3,4-Methylphenol	NE	< 0.090 U	< 0.090 U	< 0.088 U	< 0.089 U	< 0.095 U									
3-Nitroaniline	63	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
4,6-Dinitro-2-methylphenol	0.51	< 0.090 U	< 0.090 UJ	< 0.088 U	< 0.089 U	< 0.095 U	< 5.5 U	< 0.58 U	< 0.55 U	< 0.67 U	< 0.58 U	< 0.55 U	< 0.55 U	< 0.55 U	< 0.55 U
4-Bromophenyl-phenylether	NE	< 0.090 U	< 0.090 U	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
4-Chloro-3-methylphenol	630	< 0.036 U	< 0.036 UJ	< 0.035 U	< 0.035 U	< 0.038 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
4-Chloroaniline	2.7	< 0.090 U	< 0.090 U	< 0.088 U	< 0.089 U	< 0.095 U	< 0.73 U	< 0.077 U	< 0.073 U	< 0.089 U	< 0.077 U	< 0.074 U	< 0.073 U	< 0.074 U	< 0.073 U
4-Chlorophenyl-phenylether	NE	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
4-Nitroaniline	25	< 0.090 U	< 0.090 U	< 0.088 U	< 0.089 U	< 0.095 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
4-Nitrophenol	13	< 0.36 U	< 0.36 UJ	< 0.35 U	< 0.35 U	< 0.38 U	< 5.5 U	< 0.58 U	< 0.55 U	< 0.67 U	< 0.58 U	< 0.55 U	< 0.55 U	< 0.55 U	< 0.55 U
Acenaphthene	20	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.00080	3.2	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0019 J	0.023	0.20	0.43	0.13
Acenaphthylene	100	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.00078	< 0.15 U	< 0.0015 U	< 0.0015 U	< 0.0018 U	< 0.0015 U	0.00083 J	< 0.015 U	< 0.015 U	0.022
Acetophenone	780						< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U

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	Location ID	203-SB01	203-SB02	203-SB03	203-SB03	203-SB05	203-SB06	203-SB22	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29
	Sample Date	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/15/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
	Depth Interval	9 - 10 ft	1 - 2 ft	3 - 4 ft	4 - 5 ft	4 - 5 ft	7 - 8 ft	9 - 10 ft	9 - 10 ft	9 - 10 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	8 - 9 ft	8 - 9 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**														
Anthracene	100	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0016	2.2	< 0.0015 U	0.00047 J	< 0.0018 U	0.0023	0.032	0.10	0.36	0.087
Atrazine	2.4						< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Benzaldehyde	170						< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Benzo(a)anthracene	1	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0074	0.93	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0043	0.023	0.006 J	0.23	0.075
Benzo(a)pyrene	**0.115**	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0068	**0.69**	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0039	0.014	< 0.015 U	**0.14**	0.058
Benzo(b)fluoranthene	1	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.012	0.95	< 0.0015 U	< 0.0015 U	0.0026	0.0057	0.022	< 0.015 U	0.19	0.088
Benzo(g,h,i)perylene	100	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0029	0.29	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0011 J	0.0027	< 0.015 U	0.059	0.014
Benzo(k)fluoranthene	0.8	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0047	0.41	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0027	0.010	< 0.015 U	0.091	0.042
Benzoic acid	100	< 0.36 UJ	< 0.36 UJ	< 0.35 UJ	< 0.35 UJ	0.50 J	< 5.5 U	< 0.58 U	< 0.55 U	< 0.67 U	< 0.58 U	< 0.55 U	< 0.55 U	< 0.55 U	< 0.55 U
Benzyl Alcohol	630	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 5.5 U	< 0.58 U	< 0.55 U	< 0.67 U	< 0.58 U	< 0.55 U	< 0.55 U	< 0.55 U	< 0.55 U
Biphenyl, 1,1'-	**4.7**						**8.5**	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	0.62	0.90	0.028 J
Bis(2-chloro-1-methylethyl) ether	310	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Bis(2-chloroethoxy)methane	19	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Bis(2-chloroethyl)ether	0.23	< 0.036 U	< 0.036 U	< 0.035 U	< 0.035 U	< 0.038 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Bis(2-ethylhexyl)phthalate	39	< 0.036 U	< 0.036 U	< 0.035 U	< 0.035 U	< 0.038 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	0.13 J
Butyl benzyl phthalate	100	< 0.036 U	< 0.036 U	< 0.035 U	< 0.035 U	< 0.038 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Caprolactam	3100						< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
CARBAZOLE	240	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	0.96	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	0.067	< 0.036 U
Chrysene	1	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0080	0.89	0.00074 J	0.00052 J	0.0032	0.0040	0.025	0.006 J	0.20	0.070
Dibenz(a,h)anthracene	0.115	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.00095	0.053 J	< 0.0015 U	< 0.0015 U	< 0.0018 U	< 0.0015 U	0.0012 J	< 0.015 U	0.021	0.0058
Dibenzofuran	7.3	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	3.3	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	0.21	0.39	< 0.036 U
Diethyl phthalate	100	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Dimethyl phthalate	100	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Di-n-butyl phthalate	100	< 0.036 U	< 0.036 U	< 0.035 U	< 0.035 U	< 0.038 U	< 1.5 U	< 0.15 U	< 0.15 U	0.17 J	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Di-n-octyl phthalate	63	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Fluoranthene	100	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.018	2.8	0.0016 J	0.0020	0.0011 J	0.013	0.10	< 0.015 U	0.68	0.28
Fluorene	30	< 0.0022 U	0.0033	0.0030	< 0.0021 U	0.00090	6.5	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0023	0.027	0.52	0.71	0.17
Hexachlorobenzene	0.21	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.018 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U
Hexachlorobutadiene	1.2	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
hexachlorocyclopentadiene	0.18						< 5.5 U	< 0.58 U	< 0.55 U	< 0.67 U	< 0.58 U	< 0.55 U	< 0.55 U	< 0.55 U	< 0.55 U
Hexachloroethane	1.8	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Indeno(1,2,3-cd)pyrene	0.5	< 0.0022 U	< 0.0022 U	< 0.0021 U	< 0.0021 U	0.0031	0.28	< 0.0015 U	< 0.0015 U	< 0.0018 U	0.0011 J	0.0031	< 0.015 U	0.059	0.015
Isophorone	100	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Naphthalene	**3.8**	< 0.0022 U	0.0026	0.0035	< 0.0021 U	0.0043	**20**	< 0.0015 U	< 0.0015 U	< 0.0018 U	< 0.0015 U	0.0018 J	0.27	1.5	< 0.0015 U
Nitrobenzene	3.7	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
n-Nitrosodimethylamine	0.002	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 1.8 U	< 0.19 U	< 0.18 U	< 0.22 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.18 U
n-Nitroso-di-n-propylamine	0.078	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
n-Nitrosodiphenylamine	110	< 0.018 U	< 0.018 U	< 0.018 U	< 0.018 U	< 0.019 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Pentachlorophenol	1	< 0.090 UJ	< 0.090 UJ	< 0.088 UJ	< 0.089 UJ	< 0.095 UJ	< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Phenanthrene	100	< 0.0022 U	0.0051	0.0021	0.0032	0.0089	15	0.0019 J	0.0024	0.0019 J	0.013	0.15	0.99	2.1	0.58
Phenol	100	< 0.090 U	< 0.090 UJ	< 0.088 U	< 0.089 U	< 0.095 U	< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Pyrene	100	< 0.0022 U	0.0022	< 0.0021 U	< 0.0021 U	0.014	2.7	0.0011 J	0.0014 J	0.00066 J	0.0092	0.072	0.047	0.54	0.22
Tetrachlorobenzene, 1,2,4,5-	2.3						< 0.36 U	< 0.039 U	< 0.036 U	< 0.045 U	< 0.039 U	< 0.037 U	< 0.036 U	< 0.037 U	< 0.036 U
Tetrachlorophenol, 2,3,4,6-	190						< 1.5 U	< 0.15 U	< 0.15 U	< 0.18 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U
Total BaP PAHs Calculated	**0.115**	0.00508	0.00508	0.00485	0.00485	0.0101	**4.2**	0.00074	0.00052	0.0058	0.022	0.098	0.012	**0.93**	**0.35**

Notes:
All units are in milligrams per kilogram (mg/kg).
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FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
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N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 5 for selected subsurface soil screening criteria with petroleum criteria included.
SubSurface Criteria exceedances are highlighted and bolded

Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

Location Group		CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID		203-SB01	203-SB02	203-SB03	203-SB03	203-SB05	203-SB06	203-SB22	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29
Sample Date		6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/15/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
Depth Interval		9 - 10 ft	1 - 2 ft	3 - 4 ft	4 - 5 ft	4 - 5 ft	7 - 8 ft	9 - 10 ft	9 - 10 ft	9 - 10 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	8 - 9 ft	8 - 9 ft
Sample Type		N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
VOCs															
1,1,1,2-Tetrachloroethane	2	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,1,1-Trichloroethane	100	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,1,2,2-Tetrachloroethane	0.6	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 11	100						< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
1,1,2-Trichloroethane	0.15	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,1-Dichloroethane	3.6	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,1-Dichloroethene	23	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,2,3-Trichlorobenzene	6.3						< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,2,3-Trichloropropane	0.0051	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,2,4-Trimethylbenzene	3.6														
1,2-Dibromo-3-chloropropane	0.0053	< 0.0019 UJ	< 0.0019 U	< 0.0019 UJ	< 0.0020 UJ	< 0.0020 UJ	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
1,2-Dibromoethane	0.036	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,2-Dichloroethane	0.46	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,2-Dichloropropane	1	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
1,3,5-Trimethylbenzene	8.4														
1,4-Dioxane	5.3						< 81 U	< 0.21 U	< 0.15 U	< 0.21 U	< 0.19 U	< 0.16 U	< 8.1 U	< 7.8 U	< 0.15 U
2-Butanone	100	< 0.0094 UJ	< 0.0096 UJ	< 0.0093 UJ	< 0.010 UJ	< 0.010 UJ	< 3.2 U	< 0.008 U	< 0.006 U	< 0.009 U	< 0.008 U	< 0.006 U	< 0.32 U	< 0.31 U	< 0.006 U
2-Hexanone	20	< 0.0019 U	< 0.0019 U	< 0.0019 U	< 0.0020 U	< 0.0020 U	< 3.2 U	< 0.008 U	< 0.006 U	< 0.009 U	< 0.008 U	< 0.006 U	< 0.32 U	< 0.31 U	< 0.006 U
4-Isopropyltoluene	10														
4-Methyl-2-pentanone	3300						< 3.2 U	< 0.008 U	< 0.006 U	< 0.009 U	< 0.008 U	< 0.006 U	< 0.32 U	< 0.31 U	< 0.006 U
Acetone	100	< 0.0019 UJ	0.075	0.0058 J	< 0.0020 UJ	0.045 J-	< 6.4 U	< 0.017 U	0.007 J	< 0.017 U	< 0.015 U	0.006 J	< 0.64 U	< 0.62 U	0.008 J
Benzene	0.06	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Bromochloromethane	15						< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Bromodichloromethane	0.29	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Bromoform	19	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Bromomethane	0.68						< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
Carbon disulfide	77	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	0.001 J
Carbon tetrachloride	0.65	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Chlorobenzene	28	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Chloroethane	1400	< 0.00094 U	< 0.00096 U	< 0.00093 U	< 0.0010 U	< 0.0010 U	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
Chloroform	0.32	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Chloromethane	11	< 0.00056 UJ	< 0.00058 U	< 0.00056 UJ	< 0.00061 UJ	< 0.00061 UJ	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
cis-1,2-Dichloroethene	16	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
cis-1,3-Dichloropropene	NE	< 0.00056 U	< 0.00058 UJ	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
cyclohexane	650						< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Dibromochloromethane	8.3	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Dichlorodifluoromethane	8.7	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
Ethylbenzene	**1**	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	**1.8 J**	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	0.22	< 0.002 U
Isopropylbenzene	2.3						1.7 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	0.79	< 0.002 U

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Montauk, New York

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	Location ID	203-SB01	203-SB02	203-SB03	203-SB03	203-SB05	203-SB06	203-SB22	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29
	Sample Date	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/15/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
	Depth Interval	9 - 10 ft	1 - 2 ft	3 - 4 ft	4 - 5 ft	4 - 5 ft	7 - 8 ft	9 - 10 ft	9 - 10 ft	9 - 10 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	8 - 9 ft	8 - 9 ft
	Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
m,p-Xylene	NE						0.85 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	0.17 J	< 0.002 U
Methyl tert-butyl ether	0.93						< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Methylacetate	7800						< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
methylcyclohexane	NE						2.4	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	0.17 J	< 0.002 U
Methylene chloride	35	< 0.0019 U	< 0.0019 U	< 0.0019 U	< 0.0020 U	< 0.0020 U	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
Naphthalene	3.8														
n-Butylbenzene	12														
n-Propylbenzene	3.9														
o-Xylene	65						< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
sec-Butylbenzene	11														
Styrene	600	< 0.00056 U	< 0.00058 UJ	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
tert-Butylbenzene	5.9														
Tetrachloroethene	5.5	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Toluene	0.7	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
trans-1,2-Dichloroethene	100	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
trans-1,3-Dichloropropene	1.8	< 0.00056 U	< 0.00058 UJ	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Trichloroethene	0.41	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Trichlorofluoromethane	2300	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
Vinyl Acetate	91	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 1.6 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.16 U	< 0.16 U	< 0.003 U
Vinyl chloride	0.059	< 0.00056 U	< 0.00058 U	< 0.00056 U	< 0.00061 U	< 0.00061 U	< 0.81 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	< 0.078 U	< 0.002 U
Xylenes (total)	**0.26**	< 0.0017 U	< 0.0017 U	< 0.0017 U	< 0.0018 U	< 0.0018 U	**0.85 J**	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.081 U	0.17 J	< 0.002 U

Notes:
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PAH - Polycyclic Aromatic Hydrocarbon.
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SVOC - Semivolatile Organic Compound.
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SubSurface Criteria exceedances are highlighted and bolded

Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-FPH
	Location ID	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	AST35-SB01	AST35-SB01	AST35-SB01	AST35-SB02	AST35-SB02	AST35-SB03	AST35-SB04	AST35-SB04	FPH-SB02
	Sample Date	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016
	Depth Interval	9 - 10 ft	9 - 10 ft	8 - 9 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	1 - 2 ft	2 - 3 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**														
Explosives															
1,3,5-Trinitrobenzene	220														
1,3-Dinitrobenzene	0.63														
2,4,6-Trinitrotoluene	3.6														
2,4-Dinitrotoluene	1.7														
2,6-Dinitrotoluene	0.36														
2-Amino-4,6-dinitrotoluene	15														
2-Nitrotoluene	3.2														
3-Nitrotoluene	0.63														
4-Amino-2,6-Dinitro Toluene	15														
4-Nitrotoluene	25														
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1														
Methyl-2,4,6-trinitrophenylnitramine	16														
Nitrobenzene	3.7														
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocin	390														
Metals															
Aluminum	**27822**	8930	13500	12300	13300	11100									
Antimony	10.3	< 0.180 U	< 0.164 U	< 0.149 U	< 0.182 U	< 0.180 U									
Arsenic	**3.383**	**3.45**	3.02	2.98	**3.40**	2.71									
Barium	350	54.0	81.7	58.3	55.5	58.9									
Beryllium	14	0.375	0.581	0.536	0.517	0.478									
Cadmium	2.5	< 0.0900 U	0.0375 J	0.0290 J	< 0.0910 U	< 0.0900 U									
Calcium (Ca)	**751.8**	471	**1100**	413	**6920**	701									
Chromium	**33.92**	13.9	21.8	16.3	20.5	16.1									
Chromium(III), Insoluble Salts	**36**	13.5	21.8	15.9	20.1	15.4									
Chromium(VI)	**0.3**	**0.40 J**	< 0.46 UJ	**0.40 J**	**0.39 J**	**0.61**									
Cobalt	**10.24**	3.90	6.59	5.57	6.58	7.11									
Copper	270	9.08	12.9	10.4	10.1	9.86									
Iron (Fe)	**19000**	13000	16700	13400	17000	12300									
Lead	400	3.64	4.79	4.33	5.26	4.11									
Magnesium (Mg)	**8315**	2620	4520	3160	3830	2920									
Manganese (Mn)	**656.8**	179	258	161	322	163									
Mercury	0.81	< 0.0170 U	< 0.0176 U	< 0.0173 U	< 0.0179 U	< 0.0174 U									
Nickel	140	8.12	14.6	10.9	12.0	10.2									
Potassium (K)	NE	1860	3030	2290	2380	2040									
Selenium	36	< 0.180 U	< 0.164 U	0.109 J	0.112 J	0.109 J									
Silver	36	< 0.0450 U	< 0.0409 U	< 0.0372 U	< 0.0455 U	< 0.0450 U									
Sodium (Na)	**320**	89.0	143	89.2	176	91.8									
Thallium	**0.414**	0.317	0.254	0.170	0.173 J	0.181									
Vanadium	**46.28**	22.4	33.2	27.2	31.5	24.8									
Zinc	2200	20.5	34.4	23.8	26.7	21.4									

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-FPH
	Location ID	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	AST35-SB01	AST35-SB01	AST35-SB01	AST35-SB02	AST35-SB02	AST35-SB03	AST35-SB04	AST35-SB04	FPH-SB02
	Sample Date	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016
	Depth Interval	9 - 10 ft	9 - 10 ft	8 - 9 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	1 - 2 ft	2 - 3 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
PCBs															
Aroclor 1016	0.41														
Aroclor 1221	0.2														
Aroclor 1232	0.17														
Aroclor 1242	0.23														
Aroclor 1248	0.23														
Aroclor 1254	0.12														
Aroclor 1260	0.24														
Aroclor 1262	0.24														
Aroclor 1268	0.24														
SVOCs															
1,2,4-Trichlorobenzene	5.8	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
1,2-Dichlorobenzene	100	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
1,3-Dichlorobenzene	17	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
1,4-Dichlorobenzene	2.6	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
1-Methylnaphthalene	**18**	4.2	< 0.0015 U	< 0.0015 U	0.0033	< 0.0015 U									
2,4,5-Trichlorophenol	100	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2,4,6-Trichlorophenol	6.3	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2,4-Dichlorophenol	19	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2,4-Dimethylphenol	130	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2,4-Dinitrophenol	13	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U									
2,4-Dinitrotoluene	1.7	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U									
2,6-Dinitrotoluene	0.36	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2-Chloronaphthalene	480	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U									
2-Chlorophenol	39	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2-Methylnaphthalene	**0.41**	**6.6**	0.00090 J	< 0.0015 U	0.0014 J	0.00098 J									
2-Methylphenol	100	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2-Nitroaniline	63	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
2-Nitrophenol	13	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
3 or 4-Methylphenol	NE	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
3,3-Dichlorobenzidine	1.2	< 0.37 U	< 0.37 U	< 0.37 U	< 0.37 U	< 0.37 U									
3,4-Methylphenol	NE														
3-Nitroaniline	63	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
4,6-Dinitro-2-methylphenol	0.51	< 0.55 U	< 0.56 U	< 0.55 U	< 0.55 U	< 0.56 U									
4-Bromophenyl-phenylether	NE	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
4-Chloro-3-methylphenol	630	< 0.037 U	< 0.037 U	0.020 J	< 0.037 U	< 0.037 U									
4-Chloroaniline	2.7	< 0.073 U	< 0.075 U	< 0.073 U	< 0.073 U	< 0.074 U									
4-Chlorophenyl-phenylether	NE	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
4-Nitroaniline	25	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
4-Nitrophenol	13	< 0.55 U	< 0.56 U	< 0.55 U	< 0.55 U	< 0.56 U									
Acenaphthene	20	0.29	< 0.0015 U	< 0.0015 U	< 0.0015 U	< 0.0015 U	0.00082 J	0.0017 J	< 0.00074 U	< 0.00074 U	< 0.00074 U	< 0.00078 U	< 0.00075 U	0.00091	0.0014
Acenaphthylene	100	< 0.015 U	< 0.0015 U	0.0037	< 0.0015 U	< 0.0015 U	< 0.00074 U	< 0.00073 U	< 0.00074 U	< 0.00074 U	< 0.00074 U	< 0.00078 U	< 0.00075 U	< 0.00076 U	< 0.00073 U
Acetophenone	780	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									

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Montauk, New York

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	Location ID	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	AST35-SB01	AST35-SB01	AST35-SB01	AST35-SB02	AST35-SB02	AST35-SB03	AST35-SB04	AST35-SB04	FPH-SB02
	Sample Date	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016
	Depth Interval	9 - 10 ft	9 - 10 ft	8 - 9 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	1 - 2 ft	2 - 3 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
Anthracene	100	0.16	< 0.0015 U	0.021	0.00065 J	< 0.0015 U	0.00078 J	0.0027 J	0.00083	< 0.00074 U	< 0.00074 U	< 0.00078 U	0.0010	< 0.00076 U	0.00098
Atrazine	2.4	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Benzaldehyde	170	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Benzo(a)anthracene	1	< 0.015 U	< 0.0015 U	0.0019	0.0016 J	< 0.0015 U	0.0038 J	0.010 J	0.0042	0.0024	0.0015	0.0054	0.0071	0.0031	0.0020
Benzo(a)pyrene	**0.115**	< 0.015 U	< 0.0015 U	< 0.0015 U	0.0037	< 0.0015 U	0.0033 J	0.0080 J	0.0021	0.0017	0.00096	0.0038	0.0054	0.0023	0.0015
Benzo(b)fluoranthene	1	< 0.015 U	< 0.0015 U	< 0.0015 U	0.0040	< 0.0015 U	0.0058 J	0.011 J	0.0057	0.0031	0.0016	0.0066	0.0083	< 0.00076 U	0.0030
Benzo(g,h,i)perylene	100	< 0.015 U	< 0.0015 U	< 0.0015 U	0.0022	< 0.0015 U	0.0027 J	0.0011 J	< 0.00074 U	0.0013	< 0.00074 U	0.0030	0.0041	0.0026	0.0013
Benzo(k)fluoranthene	0.8	< 0.015 U	< 0.0015 U	< 0.0015 U	0.0012 J	< 0.0015 U	0.0017 J	0.0051 J	0.0012	0.0010	< 0.00074 U	0.0016	0.0031	0.0049	< 0.00073 U
Benzoic acid	100	< 0.55 U	< 0.56 U	< 0.55 U	< 0.55 U	< 0.56 U									
Benzyl Alcohol	630	< 0.55 U	< 0.56 U	< 0.55 U	< 0.55 U	< 0.56 U									
Biphenyl, 1,1'-	**4.7**	1.3	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Bis(2-chloro-1-methylethyl) ether	310	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Bis(2-chloroethoxy)methane	19	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Bis(2-chloroethyl)ether	0.23	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Bis(2-ethylhexyl)phthalate	39	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Butyl benzyl phthalate	100	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Caprolactam	3100	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
CARBAZOLE	240	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Chrysene	1	0.006 J	< 0.0015 U	< 0.0015 U	0.0022	< 0.0015 U	0.0044 J	0.0096 J	0.0031	0.0016	0.00094	0.0033	0.0050	0.0025	0.0017
Dibenz(a,h)anthracene	0.115	< 0.015 U	< 0.0015 U	< 0.0015 U	< 0.0015 U	< 0.0015 U	< 0.00074 U	< 0.00073 U	< 0.00074 U	< 0.00074 U	< 0.00074 U	< 0.00078 U	< 0.00075 U	0.0074	< 0.00073 U
Dibenzofuran	7.3	0.37	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Diethyl phthalate	100	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Dimethyl phthalate	100	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Di-n-butyl phthalate	100	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Di-n-octyl phthalate	63	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Fluoranthene	100	0.020	< 0.0015 U	0.0023	0.0032	< 0.0015 U	0.0091 J	0.021 J	0.0070	0.0032	0.0022	0.0077	0.011 J-	0.0061	0.0042
Fluorene	30	0.58	< 0.0015 U	< 0.0015 U	0.00081 J	< 0.0015 U	0.00089 J	0.0018 J	< 0.00074 U	< 0.00074 U	< 0.00074 U	< 0.00078 U	< 0.00075 U	0.0013	0.0024
Hexachlorobenzene	0.21	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U									
Hexachlorobutadiene	1.2	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
hexachlorocyclopentadiene	0.18	< 0.55 U	< 0.56 U	< 0.55 U	< 0.55 UJ	< 0.56 U									
Hexachloroethane	1.8	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Indeno(1,2,3-cd)pyrene	0.5	< 0.015 U	< 0.0015 U	< 0.0015 U	0.0020	< 0.0015 U	0.0027 J	0.0057 J	< 0.00074 U	0.0011	< 0.00074 U	0.0025	0.0035	0.0022	0.0011
Isophorone	100	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Naphthalene	**3.8**	0.75	0.0042	< 0.0015 U	0.0021	< 0.0015 U									
Nitrobenzene	3.7	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
n-Nitrosodimethylamine	0.002	< 0.18 U	< 0.19 U	< 0.18 U	< 0.18 U	< 0.19 U									
n-Nitroso-di-n-propylamine	0.078	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
n-Nitrosodiphenylamine	110	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Pentachlorophenol	1	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Phenanthrene	100	1.3	< 0.0015 U	0.0094	0.0030	0.0013 J	0.0058 J	0.014 J	0.0062	0.0024	0.0017	0.0055	0.0079	0.0071	0.011
Phenol	100	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Pyrene	100	0.050	< 0.0015 U	0.014	0.0025	< 0.0015 U	0.0074 J	0.018 J	0.0068	0.0032	0.0022	0.0078	0.011 J-	0.0063	0.0045
Tetrachlorobenzene, 1,2,4,5-	2.3	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.037 U									
Tetrachlorophenol, 2,3,4,6-	190	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U									
Total BaP PAHs Calculated	**0.115**	0.0060	< 0.0015 U	0.0019	0.015	< 0.0015 U	0.00529	0.0115	0.00392	0.00311	0.00209	0.00605	0.00808	0.0104	0.00285

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Camp Hero Remedial Investigation
Montauk, New York

Location Group		CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-FPH
Location ID		203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	AST35-SB01	AST35-SB01	AST35-SB01	AST35-SB02	AST35-SB02	AST35-SB03	AST35-SB04	AST35-SB04	FPH-SB02
Sample Date		12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016
Depth Interval		9 - 10 ft	9 - 10 ft	8 - 9 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	1 - 2 ft	2 - 3 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft
Sample Type		N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
VOCs															
1,1,1,2-Tetrachloroethane	2	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,1,1-Trichloroethane	100	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,1,2,2-Tetrachloroethane	0.6	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 11	100	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
1,1,2-Trichloroethane	0.15	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,1-Dichloroethane	3.6	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,1-Dichloroethene	23	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,2,3-Trichlorobenzene	6.3	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,2,3-Trichloropropane	0.0051	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,2,4-Trimethylbenzene	3.6						< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 UJ	< 0.00055 U	< 0.00056 U
1,2-Dibromo-3-chloropropane	0.0053	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
1,2-Dibromoethane	0.036	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,2-Dichloroethane	0.46	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,2-Dichloropropane	1	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
1,3,5-Trimethylbenzene	8.4						< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
1,4-Dioxane	5.3	< 7.2 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.15 U									
2-Butanone	100	< 0.29 U	< 0.006 U	< 0.006 U	< 0.007 U	< 0.006 U									
2-Hexanone	20	< 0.29 U	< 0.006 U	< 0.006 U	< 0.007 U	< 0.006 U									
4-Isopropyltoluene	10						0.00034 J	< 0.00056 UJ	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 UJ	< 0.00055 U	< 0.00056 U
4-Methyl-2-pentanone	3300	< 0.29 U	< 0.006 U	< 0.006 U	< 0.007 UJ	< 0.006 U									
Acetone	100	< 0.57 U	< 0.012 U	0.014 J	0.012 J	0.006 J									
Benzene	0.06	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
Bromochloromethane	15	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Bromodichloromethane	0.29	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Bromoform	19	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Bromomethane	0.68	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
Carbon disulfide	77	< 0.072 U	< 0.002 U	0.003 J	0.002 J	< 0.002 U									
Carbon tetrachloride	0.65	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Chlorobenzene	28	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Chloroethane	1400	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
Chloroform	0.32	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Chloromethane	11	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
cis-1,2-Dichloroethene	16	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
cis-1,3-Dichloropropene	NE	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
cyclohexane	650	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Dibromochloromethane	8.3	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Dichlorodifluoromethane	8.7	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
Ethylbenzene	**1**	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
Isopropylbenzene	2.3	0.042 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U

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Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-FPH
	Location ID	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	AST35-SB01	AST35-SB01	AST35-SB01	AST35-SB02	AST35-SB02	AST35-SB03	AST35-SB04	AST35-SB04	FPH-SB02
	Sample Date	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016	6/12/2016
	Depth Interval	9 - 10 ft	9 - 10 ft	8 - 9 ft	6 - 7 ft	9 - 10 ft	4 - 5 ft	4 - 5 ft	5 - 6 ft	1 - 2 ft	2 - 3 ft	1 - 2 ft	2 - 3 ft	3 - 4 ft	1 - 2 ft
	Sample Type	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical	**SubSurface Criteria (1) (mg/kg)**														
m,p-Xylene	NE	0.060 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Methyl tert-butyl ether	0.93	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
Methylacetate	7800	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
methylcyclohexane	NE	0.13 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Methylene chloride	35	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
Naphthalene	3.8						< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 UJ	< 0.00055 U	< 0.00056 U
n-Butylbenzene	12						< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
n-Propylbenzene	3.9						< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
o-Xylene	65	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
sec-Butylbenzene	11						< 0.00081 U	< 0.00093 U	< 0.00089 U	< 0.00085 U	< 0.00088 U	< 0.0010 U	< 0.059 U	< 0.00092 U	< 0.00094 U
Styrene	600	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
tert-Butylbenzene	5.9						< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
Tetrachloroethene	5.5	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Toluene	0.7	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.00048 U	< 0.00056 U	< 0.00053 U	< 0.00051 U	< 0.00053 U	< 0.00063 U	< 0.059 U	< 0.00055 U	< 0.00056 U
trans-1,2-Dichloroethene	100	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
trans-1,3-Dichloropropene	1.8	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Trichloroethene	0.41	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Trichlorofluoromethane	2300	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
Vinyl Acetate	91	< 0.14 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U									
Vinyl chloride	0.059	< 0.072 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U									
Xylenes (total)	**0.26**	0.060 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0015 U	< 0.0017 U	< 0.0016 U	< 0.0015 U	< 0.0016 U	< 0.0019 U	< 0.18 U	< 0.0017 U	< 0.0017 U

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Camp Hero Remedial Investigation
Montauk, New York

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	Location ID	FPH-SB03	FPH-SB04	FPH-SB04	MP-SB01	MP-SB01	MP-SB03	STB-SB01	STB-SB02	STB-SB03	STB-SB04	STB-SB04
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	4 - 5 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	8 - 9 ft	4 - 5 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft
	Sample Type	N	N	N	FD	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria [1] (mg/kg)**											
Explosives												
1,3,5-Trinitrobenzene	220						< 0.039 U					
1,3-Dinitrobenzene	0.63						< 0.039 U					
2,4,6-Trinitrotoluene	3.6						< 0.039 U					
2,4-Dinitrotoluene	1.7						< 0.039 U					
2,6-Dinitrotoluene	0.36						< 0.039 U					
2-Amino-4,6-dinitrotoluene	15						< 0.039 U					
2-Nitrotoluene	3.2						< 0.039 U					
3-Nitrotoluene	0.63						< 0.039 U					
4-Amino-2,6-Dinitro Toluene	15						< 0.039 U					
4-Nitrotoluene	25						< 0.039 U					
Hexahydro-1,3,5-trinitro-1,3,5-triazine	6.1						< 0.039 U					
Methyl-2,4,6-trinitrophenylnitramine	16						< 0.039 U					
Nitrobenzene	3.7						< 0.039 U					
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocin	390						< 0.039 U					
Metals												
Aluminum	**27822**											
Antimony	10.3											
Arsenic	**3.383**											
Barium	350											
Beryllium	14											
Cadmium	2.5											
Calcium (Ca)	**751.8**											
Chromium	**33.92**											
Chromium(III), Insoluble Salts	**36**											
Chromium(VI)	**0.3**											
Cobalt	**10.24**											
Copper	270											
Iron (Fe)	**19000**											
Lead	400											
Magnesium (Mg)	**8315**											
Manganese (Mn)	**656.8**											
Mercury	0.81											
Nickel	140											
Potassium (K)	NE											
Selenium	36											
Silver	36											
Sodium (Na)	**320**											
Thallium	**0.414**											
Vanadium	**46.28**											
Zinc	2200											

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	Location ID	FPH-SB03	FPH-SB04	FPH-SB04	MP-SB01	MP-SB01	MP-SB03	STB-SB01	STB-SB02	STB-SB03	STB-SB04	STB-SB04
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	4 - 5 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	8 - 9 ft	4 - 5 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft
	Sample Type	N	N	N	FD	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
PCBs												
Aroclor 1016	0.41						< 0.0073 U					
Aroclor 1221	0.2						< 0.0073 U					
Aroclor 1232	0.17						< 0.0073 U					
Aroclor 1242	0.23						< 0.0073 U					
Aroclor 1248	0.23						< 0.0073 U					
Aroclor 1254	0.12						< 0.0073 U					
Aroclor 1260	0.24						< 0.0073 U					
Aroclor 1262	0.24						< 0.0073 U					
Aroclor 1268	0.24						< 0.0073 U					
SVOCs												
1,2,4-Trichlorobenzene	5.8						< 0.018 U					
1,2-Dichlorobenzene	100						< 0.018 U					
1,3-Dichlorobenzene	17						< 0.018 U					
1,4-Dichlorobenzene	2.6						< 0.018 U					
1-Methylnaphthalene	**18**											
2,4,5-Trichlorophenol	100						< 0.036 U					
2,4,6-Trichlorophenol	6.3						< 0.036 U					
2,4-Dichlorophenol	19						< 0.090 U					
2,4-Dimethylphenol	130						< 0.090 U					
2,4-Dinitrophenol	13						< 0.18 U					
2,4-Dinitrotoluene	1.7						< 0.018 U					
2,6-Dinitrotoluene	0.36						< 0.018 U					
2-Chloronaphthalene	480						< 0.018 U					
2-Chlorophenol	39						< 0.090 U					
2-Methylnaphthalene	**0.41**											
2-Methylphenol	100						< 0.090 U					
2-Nitroaniline	63						< 0.018 U					
2-Nitrophenol	13						< 0.090 U					
3 or 4-Methylphenol	NE											
3,3-Dichlorobenzidine	1.2						< 0.72 U					
3,4-Methylphenol	NE						< 0.090 U					
3-Nitroaniline	63						< 0.018 U					
4,6-Dinitro-2-methylphenol	0.51						< 0.090 U					
4-Bromophenyl-phenylether	NE						< 0.090 U					
4-Chloro-3-methylphenol	630						< 0.036 U					
4-Chloroaniline	2.7						< 0.090 U					
4-Chlorophenyl-phenylether	NE						< 0.018 U					
4-Nitroaniline	25						< 0.090 U					
4-Nitrophenol	13						< 0.36 U					
Acenaphthene	20	< 0.00077 UJ	< 0.00075 U	< 0.00077 U	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	< 0.00080 U	< 0.00082 U	< 0.00076 UJ	< 0.00077 U
Acenaphthylene	100	0.0021 J-	0.015	< 0.00077 U	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	< 0.00080 U	< 0.00082 U	< 0.00076 UJ	< 0.00077 U
Acetophenone	780											

Notes:
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FD - Field duplicate.
ft - feet.
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J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 5 for selected subsurface soil screening criteria with petroleum cr
SubSurface Criteria exceedances are highlighted and bolded

Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB
	Location ID	FPH-SB03	FPH-SB04	FPH-SB04	MP-SB01	MP-SB01	MP-SB03	STB-SB01	STB-SB02	STB-SB03	STB-SB04	STB-SB04
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	4 - 5 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	8 - 9 ft	4 - 5 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft
	Sample Type	N	N	N	FD	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
Anthracene	100	0.11	0.050	0.036	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	< 0.00080 U	0.0011	0.0023 J	< 0.00077 UJ
Atrazine	2.4											
Benzaldehyde	170											
Benzo(a)anthracene	1	0.010 J-	0.0040	0.019	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0050 J+	0.0062	0.010 J	0.0014 J
Benzo(a)pyrene	**0.115**	0.0060 J-	0.0016	0.0085	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0048 J+	0.0054	0.0067 J	0.0011 J
Benzo(b)fluoranthene	1	0.012 J-	0.0039	0.018	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0083 J+	0.010	0.010 J	0.0023 J
Benzo(g,h,i)perylene	100	0.0063 J-	< 0.00075 U	0.0048	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0036 J+	0.0026	0.0036 J	< 0.00077 UJ
Benzo(k)fluoranthene	0.8	0.0020 J-	< 0.00075 U	0.0064	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0028 J+	0.0034	0.0029 J	0.00083 J
Benzoic acid	100						< 0.36 UJ					
Benzyl Alcohol	630						< 0.018 U					
Biphenyl, 1,1'-	**4.7**											
Bis(2-chloro-1-methylethyl) ether	310						< 0.018 U					
Bis(2-chloroethoxy)methane	19						< 0.018 U					
Bis(2-chloroethyl)ether	0.23						< 0.036 U					
Bis(2-ethylhexyl)phthalate	39						< 0.036 U					
Butyl benzyl phthalate	100						< 0.036 U					
Caprolactam	3100											
CARBAZOLE	240						< 0.018 U					
Chrysene	1	0.0061 J-	0.0036	0.013	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0060 J+	0.0058	0.0085 J	0.0016 J
Dibenz(a,h)anthracene	0.115	< 0.00077 UJ	< 0.00075 U	0.0020	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	< 0.00080 U	< 0.00082 U	< 0.00076 UJ	< 0.00077 U
Dibenzofuran	7.3						< 0.018 U					
Diethyl phthalate	100						< 0.018 U					
Dimethyl phthalate	100						< 0.018 U					
Di-n-butyl phthalate	100						< 0.036 U					
Di-n-octyl phthalate	63						< 0.018 U					
Fluoranthene	100	< 0.00077 UJ	0.026	0.024	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.014 J+	0.016	0.022 J	0.0035 J
Fluorene	30	< 0.00077 UJ	< 0.00075 U	< 0.00077 U	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	< 0.00080 U	0.00083	< 0.00076 UJ	< 0.00077 U
Hexachlorobenzene	0.21						< 0.018 U					
Hexachlorobutadiene	1.2						< 0.018 U					
hexachlorocyclopentadiene	0.18											
Hexachloroethane	1.8						< 0.018 U					
Indeno(1,2,3-cd)pyrene	0.5	0.0053 J-	< 0.00075 U	< 0.00077 U	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0036 J+	0.0026	0.0036 J	< 0.00077 UJ
Isophorone	100						< 0.018 U					
Naphthalene	**3.8**											
Nitrobenzene	3.7						< 0.018 U					
n-Nitrosodimethylamine	0.002						< 0.018 U					
n-Nitroso-di-n-propylamine	0.078						< 0.018 U					
n-Nitrosodiphenylamine	110						< 0.018 U					
Pentachlorophenol	1						< 0.090 U					
Phenanthrene	100	0.030 J-	0.38	0.038	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.0060 J+	0.0082	0.0083 J	0.0018 J
Phenol	100						< 0.090 U					
Pyrene	100	< 0.00077 UJ	0.033	0.037	< 0.0025 U	< 0.0025 UJ	< 0.00072 UJ	< 0.00077 U	0.010 J+	0.012	0.017 J	0.0030 J
Tetrachlorobenzene, 1,2,4,5-	2.3											
Tetrachlorophenol, 2,3,4,6-	190											
Total BaP PAHs Calculated	**0.115**	0.00953	0.00323	0.0144	0.00578	0.00578	0.00166	0.00178	0.00732	0.00814	0.00986	0.00233

Notes:
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PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.
1. See Table 5 for selected subsurface soil screening criteria with petroleum cr
SubSurface Criteria exceedances are highlighted and bolded

Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB
	Location ID	FPH-SB03	FPH-SB04	FPH-SB04	MP-SB01	MP-SB01	MP-SB03	STB-SB01	STB-SB02	STB-SB03	STB-SB04	STB-SB04
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	4 - 5 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	8 - 9 ft	4 - 5 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft
	Sample Type	N	N	N	FD	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria (1) (mg/kg)**											
VOCs												
1,1,1,2-Tetrachloroethane	2											
1,1,1-Trichloroethane	100											
1,1,2,2-Tetrachloroethane	0.6											
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 11	100											
1,1,2-Trichloroethane	0.15											
1,1-Dichloroethane	3.6											
1,1-Dichloroethene	23											
1,2,3-Trichlorobenzene	6.3											
1,2,3-Trichloropropane	0.0051											
1,2,4-Trimethylbenzene	3.6	< 0.00060 U	< 0.00086 U	< 0.064 UJ	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
1,2-Dibromo-3-chloropropane	0.0053											
1,2-Dibromoethane	0.036											
1,2-Dichloroethane	0.46											
1,2-Dichloropropane	1											
1,3,5-Trimethylbenzene	8.4	< 0.00060 U	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
1,4-Dioxane	5.3											
2-Butanone	100											
2-Hexanone	20											
4-Isopropyltoluene	10	0.0017	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
4-Methyl-2-pentanone	3300											
Acetone	100											
Benzene	0.06	< 0.00060 U	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
Bromochloromethane	15											
Bromodichloromethane	0.29											
Bromoform	19											
Bromomethane	0.68											
Carbon disulfide	77											
Carbon tetrachloride	0.65											
Chlorobenzene	28											
Chloroethane	1400											
Chloroform	0.32											
Chloromethane	11											
cis-1,2-Dichloroethene	16											
cis-1,3-Dichloropropene	NE											
cyclohexane	650											
Dibromochloromethane	8.3											
Dichlorodifluoromethane	8.7											
Ethylbenzene	**1**	< 0.00060 U	0.0012 J	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
Isopropylbenzene	2.3	< 0.00060 U	0.0018	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U

Notes:
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ft - feet.
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J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
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N - Normal sample.
NE - Not Established.
PAH - Polycyclic Aromatic Hydrocarbon.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
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VOC - Volatile Organic Compound.
1. See Table 5 for selected subsurface soil screening criteria with petroleum cr
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Table 9
Preliminary Screening of Subsurface Soil Results at AOCs with Petroleum Criteria
Camp Hero Remedial Investigation
Montauk, New York

	Location Group	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB	CH-AOC-STB
	Location ID	FPH-SB03	FPH-SB04	FPH-SB04	MP-SB01	MP-SB01	MP-SB03	STB-SB01	STB-SB02	STB-SB03	STB-SB04	STB-SB04
	Sample Date	6/12/2016	6/12/2016	6/12/2016	6/14/2016	6/14/2016	6/13/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Depth Interval	1 - 2 ft	4 - 5 ft	3 - 4 ft	3 - 4 ft	3 - 4 ft	8 - 9 ft	4 - 5 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft	5 - 6 ft
	Sample Type	N	N	N	FD	N	N	N	N	N	FD	N
Chemical	**SubSurface Criteria [(1)] (mg/kg)**											
m,p-Xylene	NE											
Methyl tert-butyl ether	0.93	< 0.00060 U	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
Methylacetate	7800											
methylcyclohexane	NE											
Methylene chloride	35											
Naphthalene	3.8	< 0.00060 U	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 UJ
n-Butylbenzene	12	< 0.00060 U	0.0026	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
n-Propylbenzene	3.9	< 0.00060 U	0.0024	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
o-Xylene	65											
sec-Butylbenzene	11	< 0.0010 U	0.0022 J	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00089 U	< 0.00088 U	< 0.0010 U	< 0.071 U	< 0.072 U	< 0.0010 U
Styrene	600											
tert-Butylbenzene	5.9	< 0.00060 U	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	< 0.072 U	< 0.00063 U
Tetrachloroethene	5.5											
Toluene	0.7	< 0.00060 U	< 0.00086 U	< 0.064 U	< 0.075 U	< 0.086 U	< 0.00053 U	< 0.00053 U	< 0.00060 U	< 0.071 U	0.13	< 0.00063 U
trans-1,2-Dichloroethene	100											
trans-1,3-Dichloropropene	1.8											
Trichloroethene	0.41											
Trichlorofluoromethane	2300											
Vinyl Acetate	91											
Vinyl chloride	0.059											
Xylenes (total)	**0.26**	< 0.0018 U	< 0.0026 U	< 0.19 U	< 0.22 U	< 0.26 U	< 0.0016 U	< 0.0016 U	< 0.0018 U	< 0.21 U	< 0.22 U	< 0.0019 U

Notes:
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SubSurface Criteria exceedances are highlighted and bolded

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Table 10
Summary of Preliminary Screening Evaluation and Recommendations for Phase III
Camp Hero Remedial Investigation
Montauk, New York

AOC ID	AOC Name	Evidence of Potential Source or Release from Geophysical Surveys or Field Observations	Surface Soil Results Above Preliminary Screening Values and BTVs	Subsurface Soil Results Above Preliminary Screening Values and BTVs	Recommendation for Phase III	Basis for Recommendation
203	Building 203	Yes; Residual presence of LNAPL in the subsurface, ranging from approximately 5 to 35 ft bgs	N/A - No Preliminary Screening of Surface Soil Samples; Surface Soil Sampling completed along unbiased grid for calculation of EPCs within two Sampling Units	Aluminum, Arsenic, Chromium, Chromium III, Chromium VI, Cobalt, Iron, Magnesium, Manganese, Thallium, Vanadium,1-Methylnaphthalene, 2-Methylnaphthalene, Benzo(a)pyrene, Biphenyl, 1,1'-, Naphthalene,Ethylbenzene, Total Xylenes, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs; presence of LNAPL in subsurface.
H2	Drum Location (H-2)	N/A	Lead, Manganese, Zinc	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H1	Drum Location (H-1)	N/A	Cadmium, Benzo(a)pyrene, Total BaP PAHs Calculated	Benzo(a)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H18	Drum Location (H-18)	N/A	Thallium	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
WDS	WDS SB25 - SB27 Cesspools	N/A	No Surface Soil Samples	Arsenic, Iron	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H11	Former Power Plant (H-11)	N/A	None	Arsenic, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H12	Sewage Ejector Station (H-12)	N/A	Lead	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
WDS	WDS SB23 - SB24 Tile Field	N/A	No Surface Soil Samples	Arsenic, Chromium, Vanadium	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H19	Former AST (H-19)	N/A	Lead	No Subsurface Samples	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H20	Drum Location (H-20)	N/A	Cadmium, Lead	Iron, Benzo(a)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H9	Possible Boiler (H-9)	N/A	Manganese	No Subsurface Soil Samples	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
WDS	WDS SB01 - SB03 Chlorine Contact Chamber	N/A	Lead, Manganese, Benzo(a)pyrene, Benzo(b)fluoranthene	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H15	Former Coal Storage (H-15)	N/A	Antimony, Cobalt, Manganese, Thallium	No Subsurface Soil Samples from 1 - 10 ft bgs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H5	Drum Location with Construction Debris (H-5)	N/A	Antimony, Arsenic, Beryllium, Cadmium, Cobalt, Lead, Selenium, Silver, Zinc	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
034	Former Building 34	N/A	Arsenic, Cadmium, Lead, Manganese, Thallium, Benzo(a)pyrene, Total BaP PAHs Calculated, Total HMW PAHs Calculated	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H16	Former Sewage Treatment Area (H-16)	N/A	Lead, Manganese, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Dibenzofuran, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, Pyrene, Total BaP PAHs Calculated, Total HMW PAHs Calculated, Total LMW PAHs Calculated	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
MP	Motor Pool	N/A	Total HMW PAHs Calculated	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
WDS	WDS SB08 - SB09 Box and Manhole	N/A	No Surface Soil Samples	Benzo(a)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H14	Former Coal Storage (H-14)	N/A	Arsenic, Cobalt, Magnesium, Manganese, Thallium	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.

Table 10
Summary of Preliminary Screening Evaluation and Recommendations for Phase III
Camp Hero Remedial Investigation
Montauk, New York

AOC ID	AOC Name	Evidence of Potential Source or Release from Geophysical Surveys or Field Observations	Surface Soil Results Above Preliminary Screening Values and BTVs	Subsurface Soil Results Above Preliminary Screening Values and BTVs	Recommendation for Phase III	Basis for Recommendation
WDS	WDS SB06 - SB07 Suspected Septic Tank	N/A	No Surface Soil Samples	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Dibenzofuran, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H6	Construction Debris Area (H-6)	Yes; PCBs detected in turbid grab-groundwater sample	Lead	No Subsurface Soil Samples	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs; PCBs detected in grab-groundwater sample.
WDS	WDS SB13	N/A	No Surface Soil Samples	Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Chrysene, Indeno(1,2,3-cd)pyrene, Total BaP PAHs	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H4	Construction Debris Area (H-4)	N/A	Lead	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
H3	Drum Site (H-3)	N/A	Cadmium, Zinc	None	Further Assessment Warranted	Compounds in soil exceeding preliminary screening values and BTVs.
AST35	AST-35 (H-13)	Yes; Petroleum odor and sheen from temporary wells.	None	None	Further Assessment Warranted (groundwater only)	Surface and subsurface soil samples collected in vicinity of identified buried debris had no compounds exceeding screening values or BTVs; however, field observations indicate potential
FPH	FPH for AST-35	Yes; Petroleum odor and sheen from temporary wells.	None	None	Further Assessment Warranted (groundwater only)	Surface and subsurface soil samples collected in vicinity of identified buried debris had no compounds exceeding screening values or BTVs; however, field observations indicate potential
STB	Suspected Tank B	Yes; Petroleum odor and sheen from temporary wells.	None	None	Further Assessment Warranted (groundwater only)	Surface and subsurface soil samples collected in vicinity of identified buried debris had no compounds exceeding screening values or BTVs; however, field observations indicate potential
WDS	WDS SB20 Septic Tank	N/A	No Surface Soil Samples	Calcium	NFA Warranted	Calcium was the only compound exceeding preliminary screening criteria and BTVs.
201	Building 201	N/A	No Surface Soil Samples	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
2010	Building 2010 (UST 30)	N/A	None	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
F100C	Building F100C (UST 34)	N/A	None	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
H22	Drum Site (H-22)	N/A	None	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
EFO	Engineering Field Office	N/A	None	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
H17	Open Pits (H-17)	N/A	None	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
H21	Open Pits (H-21)	N/A	None	None	NFA Warranted	No evidence of potential source or release; Calcium was the only compound exceeding preliminary screening criteria and BTVs.
P113	Plotting Room 113	Yes; Buried debris identified in geophysical survey.	None	None	NFA Warranted	No exceedances of preliminary screening criteria or BTVs for soil samples collected in vicinity of buired debris.
WDS	WDS SB04 - SB05 Septic Tank	N/A	None	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
WDS	WDS SB10 Box	N/A	No Surface Soil Samples	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
WDS	WDS SB11 Cesspool	N/A	No Surface Soil Samples	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
WDS	WDS SB12	N/A	No Surface Soil Samples	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.

Table 10
Summary of Preliminary Screening Evaluation and Recommendations for Phase III
Camp Hero Remedial Investigation
Montauk, New York

AOC ID	AOC Name	Evidence of Potential Source or Release from Geophysical Surveys or Field Observations	Surface Soil Results Above Preliminary Screening Values and BTVs	Subsurface Soil Results Above Preliminary Screening Values and BTVs	Recommendation for Phase III	Basis for Recommendation
WDS	WDS SB14 - SB17 Cesspools	N/A	No Surface Soil Samples	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
WDS	WDS SB18 - SB19	N/A	No Surface Soil Samples	No Subsurface Soil Samples from 1 - 10 ft bgs	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
WDS	WDS SB21 - SB22 Septic Tank, Drain Field	N/A	None	None	NFA Warranted	No evidence of potential source or release; no exceedances of preliminary screening criteria or BTVs.
216	Battery 216	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
AGC1	AGC Site 1	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
AGC2	AGC Site 2	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
AGC3	Camp Hero State Park Bluffs / AGC Site 3	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
AGC4	AGC Site 4	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
H7	H-7 Boiler	No; an extensive visual and magnetometer survey was was unable to locate the boilers noted by Cashin (1998).	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
H8	H-8 Boiler	No; an extensive visual and magnetometer survey was was unable to locate the boilers noted by Cashin (1998).	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STA	Building 20 (Tank A)	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STC	Building 2 (Tank C)	No; Geophysical survey indicated tank-sized subsurface anomaly. Small "test holes" verified that no tank was present in the subsurface; no petroleum odor or staining observed.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STD	Building 104R (Tank D)	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STE	Building 3001 (Tank E)	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STF	Pump House (Tank F)	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STG	Pump House (Tank G)	No; Geophysical survey completed - no tanks or underground anomalies identified.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
STH	Building 109 (Tank H)	No; Geophysical survey indicated tank-sized subsurface anomaly. Small "test holes" verified that no tank was present in the subsurface; no petroleum odor or staining observed.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No evidence of potential source or release.
112	Battery 112	N/A	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	No access (building sealed).
010	Building 10	Yes; PCBs present based on wipe/concrete chip samples.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	Removal action under separate contract. Note this Building was not included in the RI WP as an AOC but was inventoried during the Phase I Field Effort at USACE request.
107	Building 107 Electrical Substation	Yes; PCBs present based on wipe/concrete chip samples.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	Removal action under separate contract.
B113	Battery 113	Yes; PCBs present based on wipe/concrete chip samples. Two ASTs present containing weathered diesel fuel.	No Surface Soil Samples	No Subsurface Soil Samples	NFA Warranted	Removal action under separate contract.

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Appendix F

Supplemental Analytical Results

Table 1	Deep Subsurface Soil (> 10 ft bgs) Results at the former Building 203 AOC
Table 2	Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Table 3	Grab Groundwater Sample Results (Phase I)
Table 4	Groundwater Sample Results (Phase II)
Table 5	Concrete Chip Analytical Results (Phase I)
Table 6	Wipe Analytical Results (Phase I)

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Table 1
Deep Subsurface Soil (> 10 ft bgs) Results at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB01	203-SB04	203-SB04	203-SB05	203-SB07	203-SB08	203-SB09	203-SB09	203-SB10	203-SB11	203-SB12	203-SB13	203-SB14	203-SB14	203-SB15	203-SB16	203-SB16	203-SB17	203-SB17	203-SB17
Sample Date	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/14/2016	12/14/2016	12/13/2016	12/13/2016	12/13/2016	12/15/2016	12/15/2016	12/14/2016	12/13/2016	12/13/2016	12/13/2016	12/14/2016	12/14/2016	12/15/2016	12/15/2016	12/15/2016
Depth Interval	11 - 12 ft	10 - 11 ft	13 - 14 ft	20 - 21 ft	34 - 35 ft	11 - 12 ft	25 - 26 ft	25 - 26 ft	26 - 27 ft	34 - 35 ft	12 - 13 ft	27 - 28 ft	23 - 24 ft	23 - 24 ft	27 - 28 ft	18 - 19 ft	34 - 35 ft	24 - 25 ft	24 - 25 ft	39 - 40 ft
Sample Type	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N	FD	N	N
Chemical																				
Metals																				
Aluminum	9500	16000	7900	10000 J	34100	11400	30200	24700	13800	31900	6160	6380	10500	8280	21500	12100	27800	11100	11500	14400
Antimony	3.7	5.7	2.8	3.5	< 0.247 U	< 0.163 U	< 0.243 U	< 0.195 U	< 0.183 U	< 0.238 U	< 0.168 U	< 0.173 U	< 0.204 U	< 0.206 U	< 0.190 U	< 0.175 U	< 0.245 U	< 0.187 U	< 0.265 U	< 0.186 U
Arsenic	2.6	2.9	1.1 J	1.6 J	8.88	2.99	5.14	5.38	3.75	7.29	1.97	2.00	2.93	2.47	6.15	3.07	5.30	3.27	4.31	3.01
Barium	48	53	41	42 J	360	57.0	267	201	74.4	332	33.2	42.6	77.0 J	46.7 J	213	90.6	203	77.8	85.2	96.2
Beryllium	0.11 J	0.23	0.084 J	0.23	1.68	0.447	1.28	1.05	0.541	1.47	0.289	0.378	0.452	0.363	0.863	0.540	1.21	0.509	0.648	0.681
Cadmium	0.055 J	< 0.036 U	0.023 J	0.032 J	0.133 J	< 0.0813 U	0.108 J	0.127 J	< 0.0916 U	0.126 J	< 0.0838 U	< 0.0867 U	< 0.102 UJ	0.0459 J	0.0991 J	< 0.0874 U	0.0678 J	< 0.0935 U	< 0.133 U	< 0.0928 U
Chromium	21	22	13	13	73.9	22.6	63.1	52.5	26.2	67.0	10.0	12.7	20.7 J	13.8 J	50.4	23.3	57.8	23.1	23.9	26.5
Chromium(III), Insoluble Salts					73.9	22.1	62.5	51.8	26.2	66.2	10.0	12.7	20.7 J	13.4 J	49.9	22.7	57.8	22.6	23.9	23.9
Chromium(VI)					< 0.56 U	0.54	0.59	0.69	< 0.49 U	0.72	< 0.42 U	< 0.46 U	< 0.43 UJ	0.46 J	0.47 J	0.70	< 0.53 U	0.41 J	< 0.56 UJ	2.6
Cobalt	3.5	5.8	2.7	3.8	22.4	4.77	20.1	16.4	6.27	20.7	2.89	4.36	5.52 J	4.04 J	15.0	5.78	19.7	6.81	7.21	9.29
Copper	38	45	31	31 J+	43.8	10.7	40.1	30.3	13.0	42.2	7.87	8.20	11.8	9.81	29.1	12.3	35.2	12.9	14.1	16.3
Iron (Fe)	13000	18000	13000	12000 J	54800	14500	40300	34300	17500	42800	9410	10800	14900	11700	31100	16300	34500	16700	20100	21300
Lead	2.2 J	3.1 J	2.8 J	3.5 J	15.5	5.52	12.2	9.51	5.84	13.5	3.07	3.53	4.62	5.20	8.23	4.93	9.58	5.11	5.84	6.24
Manganese (Mn)	210	260	120	130 J	1070	208	674	677	230	1000	103	134	219	170	697	277	512	269	336	273
Mercury					< 0.0221 U	< 0.0178 U	< 0.0216 U	< 0.0221 U	< 0.0194 U	< 0.0211 U	< 0.0180 U	< 0.0185 U	< 0.0177 U	< 0.0206 U	< 0.0213 U	< 0.0189 U	< 0.0215 U	< 0.0168 U	< 0.0212 U	< 0.0189 U
Nickel	11	14	6.3	8.4 J+	49.4	10.3	40.1	32.4	12.5	45.4	5.82	7.92	11.9 J	7.67 J	32.9	13.5	40.5	14.1	14.9	17.7
Potassium (K)	1700	3000	1400	1500 J	15600	2120	12100	8960	2660	13700	1200	1830	2740 J	1620 J	7150	3290	9700	3010	3010	4320
Selenium	< 1.1 U	< 1.1 U	< 1.0 U	< 1.3 U	0.129 J	0.0808 J	< 0.243 UJ	0.155 J	0.148 J	0.109 J	< 0.168 U	< 0.173 U	< 0.204 U	< 0.206 U	< 0.190 U	< 0.175 U	0.152 J	0.129 J	0.154 J	0.217 J
Silver	< 0.18 U	< 0.18 U	< 0.17 U	< 0.22 U	0.0523 J	< 0.0407 U	< 0.0608 U	< 0.0489 U	< 0.0458 U	0.0560 J	< 0.0419 U	< 0.0434 U	< 0.0511 U	< 0.0514 U	< 0.0475 U	< 0.0437 U	0.0325 J	< 0.0468 U	< 0.0663 U	0.0260 J
Thallium	0.13 J	0.19	0.24	0.19	0.689	0.166	0.602	0.487	0.167 J	0.592	0.117 J	0.140 J	0.214 J	0.133 J	0.398	0.239	0.510	0.266	0.285	0.321
Vanadium	19	28	19	22 J+	108	27.6	88.9	71.0	31.9	99.3	15.6	21.0	27.7	21.6	66.3	32.8	76.2	34.1	39.3	41.9
Zinc	16	44	15	16	120	26.0	95.6	74.9	32.5	108	18.9	22.7	28.9	29.0	66.5	34.1	83.9	33.4	39.1	44.9
PCBs																				
Aroclor 1016	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1221	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1232	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1242	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1248	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1254	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1260	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1262	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
Aroclor 1268	< 0.0073 U	< 0.0072 U	< 0.0070 U	< 0.0086 U																
SVOCs																				
1,2,4-Trichlorobenzene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
1,2-Dichlorobenzene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
1,3-Dichlorobenzene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
1,4-Dichlorobenzene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
1-Methylnaphthalene	0.0036	< 0.00072 U	< 0.00071 U	60 J	0.0024	19	7.2 J	15 J	5.8	0.0080	15	25	29 J	19 J	95	17	1.4	16	16	0.085
2,4,5-Trichlorophenol	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2,4,6-Trichlorophenol	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2,4-Dichlorophenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2,4-Dimethylphenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2,4-Dinitrophenol	< 0.19 UJ	< 0.18 UJ	< 0.17 UJ	< 0.22 UJ	< 1.4 U	< 1.1 U	< 1.3 U	< 1.4 U	< 1.2 U	< 1.4 U	< 1.1 U	< 1.1 U	< 11 U	< 1.2 U	< 13 U	< 1.2 U	< 1.3 U	< 1.1 U	< 1.4 U	< 1.2 U
2,4-Dinitrotoluene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.23 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.20 U	< 0.23 U	< 0.18 U	< 0.18 U	< 1.9 U	< 0.20 U	< 2.2 U	< 0.19 U	< 0.22 U	< 0.18 U	< 0.23 U	< 0.19 U
2,6-Dinitrotoluene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2-Chloronaphthalene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.018 U	< 0.015 U	< 0.018 U	< 0.018 U	< 0.016 U	< 0.018 U	< 0.014 U	< 0.015 U	< 0.15 U	< 0.016 U	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	< 0.015 U
2-Chlorophenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2-Methylnaphthalene	0.0040	< 0.00072 U	< 0.00071 U	54 J	0.0040	31	11 J	23 J	5.1	0.018	16	41	48 J	31 J	160	29	2.3	26	26	0.13
2-Methylphenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2-Nitroaniline	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
2-Nitrophenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
3 or 4-Methylphenol					< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
3,3-Dichlorobenzidine	< 0.75 UJ	< 0.72 UJ	< 0.69 UJ	< 0.87 UJ	< 0.45 U	< 0.37 U	< 0.44 U	< 0.45 U	< 0.40 U	< 0.45 U	< 0.36 U	< 0.37 U	< 3.7 U	< 0.41 U	< 4.4 U	< 0.39 U	< 0.44 U	< 0.36 U	< 0.46 U	< 0.39 U
3,4-Methylphenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U																
3-Nitroaniline	< 0.019 U	0.014 J	< 0.017 U	< 0.022 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
4,6-Dinitro-2-methylphenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.68 U	< 0.55 U	< 0.66 U	< 0.68 U	< 0.60 U	< 0.68 U	< 0.54 U	< 0.55 U	< 5.6 U	< 0.61 U	< 6.6 U	< 0.58 U	< 0.65 U	< 0.54 U	< 0.68 U	< 0.58 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 1
Deep Subsurface Soil (> 10 ft bgs) Results at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB01	203-SB04	203-SB04	203-SB05	203-SB07	203-SB08	203-SB09	203-SB09	203-SB10	203-SB11	203-SB12	203-SB13	203-SB14	203-SB14	203-SB15	203-SB16	203-SB16	203-SB17	203-SB17	203-SB17
Sample Date	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/14/2016	12/14/2016	12/13/2016	12/13/2016	12/13/2016	12/15/2016	12/15/2016	12/14/2016	12/13/2016	12/13/2016	12/13/2016	12/14/2016	12/14/2016	12/15/2016	12/15/2016	12/15/2016
Depth Interval	11 - 12 ft	10 - 11 ft	13 - 14 ft	20 - 21 ft	34 - 35 ft	11 - 12 ft	25 - 26 ft	25 - 26 ft	26 - 27 ft	34 - 35 ft	12 - 13 ft	27 - 28 ft	23 - 24 ft	23 - 24 ft	27 - 28 ft	18 - 19 ft	34 - 35 ft	24 - 25 ft	24 - 25 ft	39 - 40 ft
Sample Type	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N	FD	N	N
Chemical																				
SVOCs Continued																				
4-Bromophenyl-phenylether	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
4-Chloro-3-methylphenol	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
4-Chloroaniline	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.091 U	< 0.074 U	< 0.088 U	< 0.091 U	< 0.080 U	< 0.091 U	< 0.071 U	< 0.073 U	< 0.74 U	< 0.081 U	< 0.88 U	< 0.077 U	< 0.087 U	< 0.072 U	< 0.091 U	< 0.077 U
4-Chlorophenyl-phenylether	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
4-Nitroaniline	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
4-Nitrophenol	< 0.37 U	< 0.36 U	< 0.35 U	< 0.43 U	< 0.68 U	< 0.55 U	< 0.66 U	< 0.68 U	< 0.60 U	< 0.68 U	< 0.54 U	< 0.55 U	< 5.6 U	< 0.61 U	< 6.6 U	< 0.58 U	< 0.65 U	< 0.54 U	< 0.68 U	< 0.58 U
Acenaphthene	< 0.0022 U	< 0.00072 U	< 0.00071 U	22 J	< 0.0018 U	0.96	0.45 J	0.86 J	0.50	0.0017 J	0.96	0.96	1.7 J	1.0 J	5.0	0.82	0.099	0.84	0.82	0.0037 J+
Acenaphthylene	< 0.0022 U	< 0.00072 U	< 0.00071 U	3.6 J	< 0.0018 U	< 0.015 U	< 0.018 U	< 0.018 U	0.19	0.00055 J	< 0.014 U	< 0.015 U	0.88 J	< 0.016 UJ	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	0.0016 J
Acetophenone					< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Anthracene	< 0.0022 U	< 0.00072 U	< 0.00071 U	6.7 J	< 0.0018 U	0.68	0.31 J	0.59 J	0.32	0.0016 J	0.65	0.81	1.0 J	0.68 J	3.2	0.59	0.066	0.64	0.58	0.0016 J
Atrazine					< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Benzaldehyde					< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Benzo(a)anthracene	< 0.0022 U	< 0.00072 U	< 0.00071 U	< 2.6 UJ	< 0.0018 U	0.014 J	0.026 J	0.061 J	0.058	0.0011 J	0.043	0.011 J	0.10 J	0.067 J	< 0.18 U	0.007 J	< 0.017 U	0.006 J	0.007 J	< 0.0015 U
Benzo(a)pyrene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.071 J	< 0.0018 U	0.007 J	0.018 J	0.041 J	0.036	< 0.0018 U	0.029	< 0.015 U	0.065 J	0.044 J	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	0.0018 J
Benzo(b)fluoranthene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.12 J	0.0014 J	0.009 J	0.024 J	0.060 J	0.055	0.0028	0.039	< 0.015 U	0.093 J	0.059 J	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	0.0016 J
Benzo(g,h,i)perylene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.031 J	< 0.0018 U	< 0.015 U	0.008 J	0.019 J	0.015 J	< 0.0018 U	0.013 J	< 0.015 U	< 0.15 UJ	0.019 J	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	0.0013 J
Benzo(k)fluoranthene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.038 J	< 0.0018 U	0.004 J	0.011 J	0.029 J	0.024	< 0.0018 U	0.017 J	< 0.015 U	< 0.15 UJ	0.019 J	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	0.0011 J
Benzoic acid	< 0.37 UJ	< 0.36 UJ	< 0.35 UJ	< 0.43 UJ	< 0.68 U	< 0.55 U	< 0.66 U	< 0.68 U	< 0.60 U	< 0.68 U	< 0.54 U	< 0.55 U	< 5.6 U	< 0.61 U	< 6.6 U	< 0.58 U	< 0.65 U	< 0.54 U	< 0.68 U	< 0.58 U
Benzyl Alcohol	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.68 U	< 0.55 U	< 0.66 U	< 0.68 U	< 0.60 U	< 0.68 U	< 0.54 U	< 0.55 U	< 5.6 U	< 0.61 U	< 6.6 U	< 0.58 U	< 0.65 U	< 0.54 U	< 0.68 U	< 0.58 U
Biphenyl, 1,1'-					< 0.045 U	4.4	1.7 J	3.1 J	0.94	< 0.045 U	4.2	4.3	5.4 J	3.2 J	< 0.44 U	3.3	0.39	3.8	3.7	0.025 J
Bis(2-chloro-1-methylethyl) ether	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Bis(2-chloroethoxy)methane	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Bis(2-chloroethyl)ether	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Bis(2-ethylhexyl)phthalate	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.18 U	0.30	2.0 J	< 0.18 UJ	0.72	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 UJ	0.22 J	< 1.8 U	< 0.15 U	0.12 J	< 0.14 U	< 0.18 U	< 0.15 U
Butyl benzyl phthalate	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Caprolactam					< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
CARBAZOLE	< 0.019 U	< 0.018 U	< 0.017 U	0.18 J	< 0.045 U	0.11	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	0.090	0.13	< 0.37 UJ	0.12 J	< 0.44 U	0.11	< 0.044 U	0.11	0.097	< 0.039 U
Chrysene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.11 J	0.0017 J	0.018 J	0.027 J	0.061 J	0.060	0.0030	0.044	0.021	0.096 J	0.066 J	0.060 J	0.012 J	< 0.017 U	0.010 J	0.013 J	0.00042 J
Dibenz(a,h)anthracene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.013 J	< 0.0018 U	< 0.015 U	< 0.018 U	< 0.018 U	< 0.016 U	< 0.0018 U	0.004 J	< 0.015 U	< 0.15 UJ	0.006 J	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	< 0.0015 U
Dibenzofuran	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	1.3	< 0.044 UJ	1.1 J	0.51	< 0.045 U	1.2	1.4	2.1 J	1.2 J	< 0.44 U	1.2	0.14	1.2	1.2	< 0.039 U
Diethyl phthalate	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Dimethyl phthalate	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 UJ	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Di-n-butyl phthalate	< 0.037 U	< 0.036 U	< 0.035 U	< 0.043 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Di-n-octyl phthalate	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Fluoranthene	< 0.0022 U	< 0.00072 U	< 0.00071 U	3.6 J	< 0.0018 U	0.11	0.11 J	0.24 J	0.20	0.0030	0.24	0.12	0.37 J	0.24 J	0.42	0.093	0.012 J	0.098	0.088	0.0012 J
Fluorene	< 0.0022 U	< 0.00072 U	< 0.00071 U	20 J	< 0.0018 U	2.2	0.87 J	1.5 J	0.86	0.0039	2.1	2.2	3.6 J	1.8 J	9.8	1.8	0.23	1.9	1.9	0.0095
Hexachlorobenzene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.018 U	< 0.015 U	< 0.018 U	< 0.018 U	< 0.016 U	< 0.018 U	< 0.014 U	< 0.015 U	< 0.15 U	< 0.016 U	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	< 0.015 U
Hexachlorobutadiene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
hexachlorocyclopentadiene					< 0.68 U	< 0.55 U	< 0.66 U	< 0.68 U	< 0.60 U	< 0.68 U	< 0.54 U	< 0.55 U	< 5.6 U	< 0.61 U	< 6.6 U	< 0.58 U	< 0.65 U	< 0.54 U	< 0.68 U	< 0.58 U
Hexachloroethane	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Indeno(1,2,3-cd)pyrene	< 0.0022 U	< 0.00072 U	< 0.00071 U	0.031 J	< 0.0018 U	< 0.015 U	0.008 J	0.018 J	0.018 J	< 0.0018 U	0.012 J	< 0.015 U	< 0.15 UJ	0.018 J	< 0.18 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.018 U	0.0019 J
Isophorone	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Naphthalene	< 0.0022 U	< 0.00072 U	< 0.00071 U	3.9 J	0.0015 J	8.5	2.7 J	5.1 J	1.4	0.0015 J	5.6	13	14 J	8.8 J	48	7.9	0.47	7.5	7.1	0.087
Nitrobenzene	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
n-Nitrosodimethylamine	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.23 U	< 0.18 U	< 0.22 U	< 0.23 U	< 0.20 U	< 0.23 U	< 0.18 U	< 0.18 U	< 1.9 U	< 0.20 U	< 2.2 U	< 0.19 U	< 0.22 U	< 0.18 U	< 0.23 U	< 0.19 U
n-Nitroso-di-n-propylamine	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
n-Nitrosodiphenylamine	< 0.019 U	< 0.018 U	< 0.017 U	< 0.022 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Pentachlorophenol	< 0.093 UJ	< 0.090 UJ	< 0.087 UJ	< 0.11 UJ	< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U
Phenanthrene	< 0.0022 U	< 0.00072 U	< 0.00071 U	45 J	0.0017 J	4.6	2.0 J	4.0 J	2.3	0.017	5.2	5.9	7.0 J	4.8 J	22	4.1	0.46	3.8	4.1	0.024
Phenol	< 0.093 U	< 0.090 U	< 0.087 U	< 0.11 U	< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Pyrene	< 0.0022 U	< 0.00072 U	< 0.00071 U	4.4 J-	0.00056 J	0.25	0.14 J	0.29 J	0.21	0.0027	0.30	0.30	0.57 J	0.37 J	0.86	0.23	0.025	0.22	0.20	0.0018 J
Tetrachlorobenzene, 1,2,4,5-					< 0.045 U	< 0.037 U	< 0.044 U	< 0.045 U	< 0.040 U	< 0.045 U	< 0.036 U	< 0.037 U	< 0.37 U	< 0.041 U	< 0.44 U	< 0.039 U	< 0.044 U	< 0.036 U	< 0.046 U	< 0.039 U
Tetrachlorophenol, 2,3,4,6-					< 0.18 U	< 0.15 U	< 0.18 U	< 0.18 U	< 0.16 U	< 0.18 U	< 0.14 U	< 0.15 U	< 1.5 U	< 0.16 U	< 1.8 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.18 U	< 0.15 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 1
Deep Subsurface Soil (> 10 ft bgs) Results at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB01	203-SB04	203-SB04	203-SB05	203-SB07	203-SB08	203-SB09	203-SB09	203-SB10	203-SB11	203-SB12	203-SB13	203-SB14	203-SB14	203-SB15	203-SB16	203-SB16	203-SB17	203-SB17	203-SB17
Sample Date	6/16/2016	6/16/2016	6/16/2016	6/16/2016	12/14/2016	12/14/2016	12/13/2016	12/13/2016	12/13/2016	12/15/2016	12/15/2016	12/14/2016	12/13/2016	12/13/2016	12/13/2016	12/14/2016	12/14/2016	12/15/2016	12/15/2016	12/15/2016
Depth Interval	11 - 12 ft	10 - 11 ft	13 - 14 ft	20 - 21 ft	34 - 35 ft	11 - 12 ft	25 - 26 ft	25 - 26 ft	26 - 27 ft	34 - 35 ft	12 - 13 ft	27 - 28 ft	23 - 24 ft	23 - 24 ft	27 - 28 ft	18 - 19 ft	34 - 35 ft	24 - 25 ft	24 - 25 ft	39 - 40 ft
Sample Type	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N	FD	N	N
Chemical																				
VOCs																				
1,1,1,2-Tetrachloroethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 UJ	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,1,1-Trichloroethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,1,2,2-Tetrachloroethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)					< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
1,1,2-Trichloroethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,1-Dichloroethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,1-Dichloroethene	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,2,3-Trichlorobenzene					< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,2,3-Trichloropropane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,2-Dibromo-3-chloropropane	< 0.0018 U	< 0.0019 UJ	< 0.0017 UJ	< 0.0022 UJ	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
1,2-Dibromoethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,2-Dichloroethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,2-Dichloropropane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
1,4-Dioxane					< 0.21 U	< 7.9 U	< 0.19 U	< 0.22 U	< 9.0 U	< 0.20 U	< 8.8 U	< 30 U	< 7.4 UJ	< 8.8 U	< 9.9 UJ	< 86 UJ	< 9.7 U	< 9.6 U	< 42 U	< 0.16 U
2-Butanone	< 0.0089 UJ	< 0.0097 UJ	< 0.0083 UJ	< 0.011 UJ	< 0.009 U	< 0.32 U	< 0.008 U	< 0.009 U	< 0.36 U	< 0.008 U	< 0.35 U	< 1.2 U	< 0.30 U	< 0.35 U	< 0.40 UJ	< 3.4 UJ	< 0.39 U	< 0.38 U	< 1.7 U	< 0.006 U
2-Hexanone	< 0.0018 U	< 0.0019 U	< 0.0017 U	< 0.0022 U	< 0.009 U	< 0.32 U	< 0.008 U	< 0.009 U	< 0.36 U	< 0.008 U	< 0.35 U	< 1.2 U	< 0.30 U	< 0.35 U	< 0.40 UJ	< 3.4 UJ	< 0.39 U	< 0.38 U	< 1.7 U	< 0.006 U
4-Methyl-2-pentanone					< 0.009 UJ	< 0.32 U	< 0.008 U	< 0.009 U	< 0.36 U	< 0.008 UJ	< 0.35 U	< 1.2 U	< 0.30 U	< 0.35 U	< 0.40 UJ	< 3.4 UJ	< 0.39 U	< 0.38 U	< 1.7 U	< 0.006 UJ
Acetone	0.012	0.0060 J	< 0.0017 UJ	< 0.0022 UJ	< 0.017 U	< 0.63 U	< 0.015 U	< 0.017 U	< 0.72 U	< 0.016 U	< 0.70 U	< 2.4 U	< 0.59 U	< 0.71 U	< 0.79 UJ	< 6.9 UJ	< 0.78 U	< 0.77 U	< 3.4 U	0.009 J
Benzene	< 0.00053 U	< 0.00058 U	< 0.00050 U	0.48	< 0.002 U	< 0.079 U	0.032	0.041	< 0.090 U	< 0.002 U	< 0.088 U	0.23 J	< 0.074 U	< 0.088 U	0.069 J	0.29 J	0.083 J	0.10 J	0.58 J	0.047
Bromochloromethane					< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Bromodichloromethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Bromoform	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Bromomethane					< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
Carbon disulfide	0.00095	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Carbon tetrachloride	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Chlorobenzene	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Chloroethane	< 0.00089 U	< 0.00097 U	< 0.00083 U	< 0.0011 U	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
Chloroform	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Chloromethane	< 0.00053 U	< 0.00058 UJ	< 0.00050 UJ	< 0.00066 UJ	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
cis-1,2-Dichloroethene	< 0.00053 U	< 0.00058 U	< 0.00050 U	0.0025 J-	< 0.002 U	< 0.079 U	0.010 J	0.015 J	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	0.098 J	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
cis-1,3-Dichloropropene	< 0.00053 UJ	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
cyclohexane					< 0.002 U	< 0.079 U	0.008 J	0.011 J	< 0.090 U	< 0.002 U	0.057 J	0.53 J	0.38 J	0.83 J	< 0.099 UJ	1.0 J	< 0.097 U	0.29 J	2.3 J	0.006
Dibromochloromethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Dichlorodifluoromethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
Ethylbenzene	< 0.00053 U	< 0.00058 U	< 0.00050 U	7.2	< 0.002 U	0.11 J	0.015 J	0.028 J	0.44	< 0.002 U	0.26	1.4	1.4 J	2.5 J	0.22 J	4.5 J-	< 0.097 U	0.85 J	6.1 J	0.038
Isopropylbenzene					< 0.002 U	0.054 J	0.005 J	0.012 J	0.24	< 0.002 U	0.24	0.45 J	0.83 J	1.3 J	0.090 J	1.5 J	< 0.097 U	0.29 J	2.1 J	0.006
m,p-Xylene					< 0.002 U	0.14 J	0.024 J	0.057 J	0.35	< 0.002 U	0.24	4.7	2.4 J	4.8 J	0.24 J	5.2 J-	< 0.097 U	1.8 J	13 J	0.032
Methyl tert-butyl ether					< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Methylacetate					< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
methylcyclohexane					< 0.002 U	0.15 J	0.012 J	0.020 J	0.24	< 0.002 U	0.63	2.2	2.9 J	5.9 J	0.13 J	4.9 J-	< 0.097 U	1.4 J	11 J	0.008
Methylene chloride	< 0.0018 U	< 0.0019 U	< 0.0017 UJ	< 0.0022 U	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
o-Xylene					< 0.002 U	0.11 J	0.001 J	0.006 J	< 0.090 U	< 0.002 U	< 0.088 U	2.0	0.15 J	0.38 J	< 0.099 UJ	3.0 J-	< 0.097 U	0.57 J	4.6 J	0.002 J
Styrene	< 0.00053 UJ	< 0.00058 U	< 0.00050 U	< 0.00066 UJ	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Tetrachloroethene	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 UJ	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Toluene	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	0.32 J	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 UJ	0.25 J	< 0.002 U
trans-1,2-Dichloroethene	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
trans-1,3-Dichloropropene	< 0.00053 UJ	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Trichloroethene	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Trichlorofluoromethane	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
Vinyl Acetate	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 UJ	< 0.004 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.18 U	< 0.004 U	< 0.18 U	< 0.61 U	< 0.15 U	< 0.18 U	< 0.20 UJ	< 1.7 UJ	< 0.19 U	< 0.19 U	< 0.84 U	< 0.003 U
Vinyl chloride	< 0.00053 U	< 0.00058 U	< 0.00050 U	< 0.00066 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.090 U	< 0.002 U	< 0.088 U	< 0.30 U	< 0.074 U	< 0.088 U	< 0.099 UJ	< 0.86 UJ	< 0.097 U	< 0.096 U	< 0.42 U	< 0.002 U
Xylenes (total)	< 0.0016 U	< 0.0018 U	< 0.0015 U	6.1	< 0.002 U	0.25	0.026 J	0.063 J	0.35	< 0.002 U	0.24	6.7	2.5 J	5.2 J	0.24 J	8.2 J-	< 0.097 U	2.3 J	18 J	0.035

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 1
Deep Subsurface Soil (> 10 ft bgs) Results at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB18	203-SB18	203-SB19	203-SB20	203-SB21	203-SB34	203-SB35	203-SB36	203-SB36	203-SB37
Sample Date	12/13/2016	12/13/2016	12/8/2016	12/13/2016	12/12/2016	12/14/2016	12/8/2016	12/8/2016	12/8/2016	12/8/2016
Depth Interval	17 - 18 ft	22 - 23 ft	19 - 20 ft	23 - 24 ft	23 - 24 ft	39 - 40 ft	32 - 33 ft	25 - 26 ft	25 - 26 ft	24 - 25 ft
Sample Type	N	N	N	N	N	N	N	FD	N	N
Chemical										
Metals										
Aluminum	7870	5300	6970 J+	5300	5880	33600	9970	11500 J	17900 J	6950
Antimony	< 0.204 U	< 0.206 U	< 0.170 UJ	< 0.202 U	< 0.157 U	< 0.207 U	< 0.153 U	< 0.214 U	< 0.216 UJ	< 0.158 U
Arsenic	2.56	1.75	2.49	1.78	1.84	8.22	2.60	2.41 J	3.88 J	2.23
Barium	48.1	32.2	44.4 J+	32.7	39.5	357	45.8	71.8 J	112 J	52.8
Beryllium	0.310	0.282	0.292	0.278	0.294	1.67	0.387	0.504 J	0.736 J	0.300
Cadmium	< 0.102 U	< 0.103 U	< 0.0852 U	< 0.101 U	0.0309 J	0.0512 J	< 0.0765 U	0.0590 J	0.0656 J	0.0418 J
Chromium	13.6	9.89	13.2 J	9.70	10.3	68.4	12.6	22.1 J	33.0 J	15.7
Chromium(III), Insoluble Salts	13.6	9.4	12.9	9.0	10.3	68.4	12.6	21.5 J	32.3 J	15.2
Chromium(VI)	< 0.44 U	0.45	0.32 J	0.75	< 0.42 U	< 0.58 U	< 0.45 U	0.58	0.64	0.42 J
Cobalt	3.66	3.11	4.06 J	3.53	4.55	21.4	7.79	7.83	10.1 J	4.89
Copper	8.90	6.20	7.66	6.44	6.69	42.1	15.3	13.3 J	19.0 J	8.76
Iron (Fe)	11300	8490	11200 J	8520	9760	52800	20100	19200	24700 J-	11200
Lead	3.55	2.85	3.96 J	3.13	2.93	15.2	4.01	5.07 J	7.13 J	3.24
Manganese (Mn)	131	97.2	182 J-	90.5	145	1000	217	218 J	310 J	152
Mercury	< 0.0174 U	< 0.0174 U	< 0.0180 U	< 0.0178 U	< 0.0174 U	< 0.0217 U	< 0.0185 U	< 0.0190 U	< 0.0191 U	< 0.0173 U
Nickel	8.25	5.72	7.21	5.99	6.32	46.7	8.65	14.3 J	21.6 J	10.6
Potassium (K)	1640	1170	1830 J+	1190	1420	14900	1640	3070 J	5080 J	1890
Selenium	< 0.204 U	< 0.206 U	< 0.170 UJ	< 0.202 U	< 0.157 U	0.130 J	0.159 J	0.100 J	0.161 J	< 0.158 U
Silver	< 0.0509 U	< 0.0516 U	< 0.0426 UJ	< 0.0506 U	< 0.0392 U	0.0481 J	< 0.0383 U	< 0.0534 UJ	0.0292 J	< 0.0396 U
Thallium	0.146 J	0.102 J	0.116 J	0.128 J	0.143 J	0.647	0.115 J	0.175 J	0.318 J	0.139 J
Vanadium	21.7	16.0	20.8 J+	16.6	17.5	104	30.4	30.7 J	49.0 J	22.0
Zinc	18.9	15.7	19.8 J+	16.1	17.9	113	26.6	31.6 J	48.1 J	22.3
PCBs										
Aroclor 1016										
Aroclor 1221										
Aroclor 1232										
Aroclor 1242										
Aroclor 1248										
Aroclor 1254										
Aroclor 1260										
Aroclor 1262										
Aroclor 1268										
SVOCs										
1,2,4-Trichlorobenzene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
1,2-Dichlorobenzene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
1,3-Dichlorobenzene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
1,4-Dichlorobenzene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
1-Methylnaphthalene	26	24 J+	22 J-	15	14	0.11	13	7.6	7.0 J	1.5
2,4,5-Trichlorophenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2,4,6-Trichlorophenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2,4-Dichlorophenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2,4-Dimethylphenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2,4-Dinitrophenol	< 11 U	< 11 U	< 1.1 UJ	< 1.1 U	< 1.1 U	< 1.4 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.1 U
2,4-Dinitrotoluene	< 1.8 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.23 U	< 0.18 U	< 0.20 U	< 0.20 U	< 0.18 U
2,6-Dinitrotoluene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2-Chloronaphthalene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	< 0.019 U	< 0.015 U	< 0.016 U	< 0.016 U	< 0.015 U
2-Chlorophenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2-Methylnaphthalene	43	42 J+	37 J-	25	22	0.19	21	13	12 J	1.6
2-Methylphenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2-Nitroaniline	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
2-Nitrophenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
3 or 4-Methylphenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
3,3-Dichlorobenzidine	< 3.6 U	< 3.6 U	< 0.36 U	< 0.37 U	< 0.36 U	< 0.46 U	< 0.37 U	< 0.39 U	< 0.40 UJ	< 0.37 U
3,4-Methylphenol										
3-Nitroaniline	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
4,6-Dinitro-2-methylphenol	< 5.4 U	< 5.4 U	< 0.54 U	< 0.55 U	< 0.54 U	< 0.69 U	< 0.55 U	< 0.59 U	< 0.61 U	< 0.55 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 1
Deep Subsurface Soil (> 10 ft bgs) Results at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB18	203-SB18	203-SB19	203-SB20	203-SB21	203-SB34	203-SB35	203-SB36	203-SB36	203-SB37
Sample Date	12/13/2016	12/13/2016	12/8/2016	12/13/2016	12/12/2016	12/14/2016	12/8/2016	12/8/2016	12/8/2016	12/8/2016
Depth Interval	17 - 18 ft	22 - 23 ft	19 - 20 ft	23 - 24 ft	23 - 24 ft	39 - 40 ft	32 - 33 ft	25 - 26 ft	25 - 26 ft	24 - 25 ft
Sample Type	N	N	N	N	N	N	N	FD	N	N
Chemical										
SVOCs Continued										
4-Bromophenyl-phenylether	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
4-Chloro-3-methylphenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
4-Chloroaniline	< 0.72 U	< 0.73 U	< 0.073 U	< 0.073 U	< 0.072 U	< 0.093 U	< 0.074 U	< 0.079 U	< 0.081 U	< 0.074 U
4-Chlorophenyl-phenylether	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
4-Nitroaniline	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
4-Nitrophenol	< 5.4 U	< 5.4 U	< 0.54 U	< 0.55 U	< 0.54 U	< 0.69 U	< 0.55 U	< 0.59 U	< 0.61 U	< 0.55 U
Acenaphthene	1.6	1.5 J+	1.9	0.73	0.76	0.015	0.93	0.63	0.64	0.23
Acenaphthylene	< 0.14 U	< 0.15 U	0.72	< 0.015 U	< 0.014 U	0.0059	0.36	0.24	0.24	0.085
Acetophenone	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Anthracene	0.88	0.79 J+	0.76	0.45	0.47	0.0075	0.43	0.25	0.26	0.095
Atrazine	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Benzaldehyde	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Benzo(a)anthracene	< 0.14 U	< 0.15 U	0.007 J	0.004 J	0.005 J	0.0010 J	0.012 J	0.008 J	0.006 J	0.004 J
Benzo(a)pyrene	< 0.14 U	< 0.15 U	0.004 J	< 0.015 U	< 0.014 U	< 0.0019 U	0.011 J	0.004 J	< 0.016 UJ	< 0.015 U
Benzo(b)fluoranthene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	0.0022 J	0.011 J	0.006 J	< 0.016 UJ	< 0.015 U
Benzo(g,h,i)perylene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	< 0.0019 U	0.008 J	< 0.016 U	< 0.016 U	< 0.015 U
Benzo(k)fluoranthene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	< 0.0019 U	0.006 J	< 0.016 U	< 0.016 U	< 0.015 U
Benzoic acid	< 5.4 U	< 5.4 U	< 0.54 U	< 0.55 U	< 0.54 U	< 0.69 U	< 0.55 U	< 0.59 U	< 0.61 UJ	< 0.55 U
Benzyl Alcohol	< 5.4 U	< 5.4 U	< 0.54 U	< 0.55 U	< 0.54 U	< 0.69 U	< 0.55 U	< 0.59 U	< 0.61 U	< 0.55 U
Biphenyl, 1,1'-	5.0	7.2	4.6	3.5	3.4	0.045 J	2.0	1.6	1.7	0.44
Bis(2-chloro-1-methylethyl) ether	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Bis(2-chloroethoxy)methane	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Bis(2-chloroethyl)ether	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Bis(2-ethylhexyl)phthalate	< 1.4 U	< 1.5 U	< 0.15 U	0.081 J	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Butyl benzyl phthalate	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Caprolactam	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
CARBAZOLE	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Chrysene	< 0.14 U	< 0.15 U	0.013 J	0.012 J	0.008 J	0.0026	0.014 J	0.009 J	0.012 J	< 0.015 U
Dibenz(a,h)anthracene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	< 0.0019 U	< 0.015 U	< 0.016 U	< 0.016 U	< 0.015 U
Dibenzofuran	2.3	1.7 J+	1.6	0.98	0.97	< 0.046 U	0.84	0.58	0.58 J	0.20
Diethyl phthalate	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Dimethyl phthalate	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Di-n-butyl phthalate	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Di-n-octyl phthalate	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Fluoranthene	0.14 J	0.092 J	0.11	0.066	0.057	0.0044	0.078	0.047	0.039 J	0.013 J
Fluorene	3.0	2.7 J+	2.5	1.4	1.4	0.033	1.2	0.87	0.91	0.29
Hexachlorobenzene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	< 0.019 U	< 0.015 U	< 0.016 U	< 0.016 U	< 0.015 U
Hexachlorobutadiene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
hexachlorocyclopentadiene	< 5.4 U	< 5.4 U	< 0.54 UJ	< 0.55 U	< 0.54 U	< 0.69 U	< 0.55 U	< 0.59 UJ	< 0.61 UJ	< 0.55 U
Hexachloroethane	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Indeno(1,2,3-cd)pyrene	< 0.14 U	< 0.15 U	< 0.015 U	< 0.015 U	< 0.014 U	< 0.0019 U	0.006 J	< 0.016 U	< 0.016 U	< 0.015 U
Isophorone	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Naphthalene	14	13 J+	11 J-	7.9	6.4	0.015	6.0	3.2	3.1 J+	0.17
Nitrobenzene	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
n-Nitrosodimethylamine	< 1.8 U	< 1.8 U	< 0.18 U	< 0.18 U	< 0.18 U	< 0.23 U	< 0.18 U	< 0.20 U	< 0.20 U	< 0.18 U
n-Nitroso-di-n-propylamine	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
n-Nitrosodiphenylamine	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Pentachlorophenol	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U
Phenanthrene	6.2	5.6 J+	4.9	3.3	3.5	0.089	2.9	1.8	1.8 J	0.69
Phenol	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Pyrene	0.34	0.26 J+	0.32	0.14	0.14	0.0069	0.16	0.11	0.11 J	0.040
Tetrachlorobenzene, 1,2,4,5-	< 0.36 U	< 0.36 U	< 0.036 U	< 0.037 U	< 0.036 U	< 0.046 U	< 0.037 U	< 0.039 U	< 0.040 U	< 0.037 U
Tetrachlorophenol, 2,3,4,6-	< 1.4 U	< 1.5 U	< 0.15 U	< 0.15 U	< 0.14 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.16 U	< 0.15 U

Notes:
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Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB18	203-SB18	203-SB19	203-SB20	203-SB21	203-SB34	203-SB35	203-SB36	203-SB36	203-SB37
Sample Date	12/13/2016	12/13/2016	12/8/2016	12/13/2016	12/12/2016	12/14/2016	12/8/2016	12/8/2016	12/8/2016	12/8/2016
Depth Interval	17 - 18 ft	22 - 23 ft	19 - 20 ft	23 - 24 ft	23 - 24 ft	39 - 40 ft	32 - 33 ft	25 - 26 ft	25 - 26 ft	24 - 25 ft
Sample Type	N	N	N	N	N	N	N	FD	N	N
Chemical										
VOCs										
1,1,1,2-Tetrachloroethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,1,1-Trichloroethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,1,2,2-Tetrachloroethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 UJ	< 0.19 U
1,1,2-Trichloroethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,1-Dichloroethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,1-Dichloroethene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,2,3-Trichlorobenzene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,2,3-Trichloropropane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,2-Dibromo-3-chloropropane	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 U	< 0.19 U
1,2-Dibromoethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,2-Dichloroethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,2-Dichloropropane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
1,4-Dioxane	< 7.5 U	< 7.5 U	< 7.1 UJ	< 7.6 U	< 7.2 U	< 0.22 U	< 8.4 UJ	< 8.5 UJ	< 8.8 UJ	< 9.3 UJ
2-Butanone	< 0.30 U	< 0.30 U	< 0.28 U	< 0.31 U	< 0.29 U	< 0.009 U	< 0.33 U	< 0.34 U	< 0.35 U	< 0.37 U
2-Hexanone	< 0.30 U	< 0.30 U	< 0.28 U	< 0.31 U	< 0.29 U	< 0.009 U	< 0.33 U	< 0.34 U	< 0.35 U	< 0.37 U
4-Methyl-2-pentanone	< 0.30 U	< 0.30 U	< 0.28 U	< 0.31 U	< 0.29 U	< 0.009 UJ	< 0.33 U	< 0.34 U	< 0.35 U	< 0.37 U
Acetone	< 0.60 U	< 0.60 U	< 0.56 U	< 0.61 U	< 0.57 U	< 0.017 U	< 0.67 U	< 0.68 U	< 0.71 U	< 0.75 U
Benzene	0.064 J	0.26	0.033 J	0.58	0.060 J	0.0006 J	0.022 J	0.16 J	0.098 J	< 0.093 U
Bromochloromethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Bromodichloromethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Bromoform	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Bromomethane	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 U	< 0.19 U
Carbon disulfide	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Carbon tetrachloride	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Chlorobenzene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Chloroethane	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 U	< 0.19 U
Chloroform	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Chloromethane	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 UJ	< 0.19 U
cis-1,2-Dichloroethene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
cis-1,3-Dichloropropene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
cyclohexane	0.88	0.95	0.075 J	2.5	0.67	0.002 J	< 0.084 U	0.44 J	0.067 J	< 0.093 U
Dibromochloromethane	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Dichlorodifluoromethane	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 UJ	< 0.19 U
Ethylbenzene	2.0	2.8	0.26 J+	4.5	0.95	0.005 J	0.34	1.4 J	0.34 J	0.055 J
Isopropylbenzene	0.89	0.96	0.10 J	1.5	0.62	0.003 J	0.14 J	0.61 J	0.12 J	0.054 J
m,p-Xylene	3.1	9.1	0.65 J	14	0.99	0.009	0.45	1.4 J	0.37 J	< 0.093 U
Methyl tert-butyl ether	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Methylacetate	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	0.29	< 0.17 U	< 0.18 U	< 0.19 U
methylcyclohexane	3.6	4.4	0.30 J+	8.1	3.1	0.013	0.096 J	2.1 J	0.29 J	0.22 J
Methylene chloride	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 U	< 0.19 U
o-Xylene	0.14 J	4.2	0.17 J	6.7	0.057 J	0.002 J	0.090 J	0.32 J	0.20 J	< 0.093 U
Styrene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Tetrachloroethene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Toluene	< 0.075 U	0.98	0.048 J	0.96	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
trans-1,2-Dichloroethene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
trans-1,3-Dichloropropene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Trichloroethene	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 U	< 0.093 U
Trichlorofluoromethane	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 UJ	< 0.19 U
Vinyl Acetate	< 0.15 U	< 0.15 U	< 0.14 U	< 0.15 U	< 0.14 U	< 0.004 U	< 0.17 U	< 0.17 U	< 0.18 U	< 0.19 U
Vinyl chloride	< 0.075 U	< 0.075 U	< 0.071 U	< 0.076 U	< 0.072 U	< 0.002 U	< 0.084 U	< 0.085 U	< 0.088 UJ	< 0.093 U
Xylenes (total)	3.3	13	0.82 J	21	1.0	0.011	0.54	1.8 J	0.57 J	< 0.093 U

Notes:
All units are in milligrams per kilogram (mg/kg).
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
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N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 2
Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB06	203-SB07	203-SB08	203-SB09	203-SB10	203-SB11	203-SB12	203-SB13	203-SB14	203-SB15	203-SB16	203-SB16	203-SB17	203-SB18	203-SB19	203-SB20	203-SB21	203-SB22	203-SB23
Sample Date	12/15/2016	12/14/2016	12/14/2016	12/13/2016	12/13/2016	12/15/2016	12/15/2016	12/14/2016	12/13/2016	12/13/2016	12/14/2016	12/14/2016	12/15/2016	12/13/2016	12/8/2016	12/13/2016	12/12/2016	12/12/2016	12/12/2016
Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	FD
Chemical																			
Metals																			
Aluminum	14100	15400	12100	11500	12200	17500	14100	15400 J+	12500	15200	13500	14400	13300 J+	14700	3820	13600 J+	12900	9620	13900
Antimony	< 0.227 U	< 0.220 U	< 0.168 U	< 0.174 U	< 0.170 U	< 0.199 U	< 0.210 U	< 0.183 UJ	< 0.167 U	< 0.213 U	< 0.168 U	< 0.206 U	< 0.195 U	< 0.229 U	< 0.196 U	< 0.178 UJ	< 0.206 U	< 0.154 U	< 0.173 U
Arsenic	3.36	3.46	3.25	2.92	2.94	3.75	3.52	3.44	2.92	4.07	3.59	3.66	3.20 J+	3.80	1.29	3.78 J-	3.52	2.69	2.74
Barium	67.7	68.5	52.4	57.2	51.7	55.9	60.8	73.6 J+	59.2	71.5	66.2	65.4	55.0 J+	78.5	13.4	59.5 J+	61.1	66.0	38.1
Beryllium	0.578	0.581	0.471	0.443	0.486	0.633	0.570	0.646	0.494	0.602	0.606	0.589	0.551	0.588	0.146 J	0.532	0.516	0.365	0.528
Cadmium	0.118 J	0.0629 J	0.0490 J	0.201	< 0.0849 U	0.0468 J	0.0737 J	0.0959 J	0.192	0.0608 J	0.0401 J	0.0409 J	0.121 J	0.0688 J	< 0.0981 U	0.0854 J	0.0536 J	< 0.0769 U	< 0.0867 UJ
Chromium	21.5	23.5	18.8	17.4	18.3	23.9	21.5	23.3	18.3	23.6	22.7	21.0	21.3	22.8	6.95	21.3 J+	20.2	14.0	18.4
Chromium(III), Insoluble Salts	20.6	22.5	18.2	16.6	17.5	22.5	21.5	22.5	17.1	22.8	21.9	20.3	20.2	21.6	6.6	20.0	19.2	13.6	13.2 J
Chromium(VI)	0.96	1.0	0.60	0.72	0.72	1.4 J	< 0.46 U	0.79	1.1	0.82	0.86 J	0.63 J	1.1	1.2	0.31 J	1.3 J	1.0	0.44 J	5.2 J
Cobalt	6.11	6.78	6.42	5.49	5.74	7.85	5.54	7.12	5.49	7.45	6.92	6.92	6.07	7.26	2.18	6.73	6.05	4.46	5.68
Copper	15.1	13.8	12.1	25.9	9.90	11.9	13.7	15.8 J	16.1	13.7	12.3	11.8	26.7 J	13.8	3.76	11.3 J+	14.4	7.49	8.89
Iron (Fe)	16800	17700	14800	14500	14600	19400	17900	17700 J	13800	18400	16200	17000	16500 J+	18600	6440	15700 J	16500	13100	14700
Lead	8.19	8.99	9.15	16.2	4.78	6.92	9.39	13.4 J	10.4	7.17	7.77	7.03	9.02 J	19.3	2.32	9.21 J	12.6	4.23	6.43
Manganese (Mn)	224	194	288	214	176	203	217	282 J-	172	263	299	291	213 J+	276	88.6	197 J+	220	176	199
Mercury	< 0.0180 U	0.0112 J	< 0.0183 U	< 0.0178 U	< 0.0174 U	0.0177 J	< 0.0179 U	< 0.0184 U	< 0.0180 U	< 0.0184 U	< 0.0173 U	< 0.0186 U	0.0127 J	< 0.0186 U	< 0.0169 U	0.0119 J	< 0.0191 U	< 0.0183 U	0.0193 J
Nickel	13.8	14.8	11.0	11.0	10.9	15.0	12.5	14.6	11.0	14.4	14.1	13.7	12.0 J+	14.2	4.21	12.3	11.5	7.53	11.6
Potassium (K)	2700	2580	2000	2080	2130	2530	2360	2640	2160	2620	2640	2460	2160	2860	282	2050 J+	2290	1690	1600
Selenium	0.184 J	0.256 J	0.196 J	0.169 J	0.183 J	0.341 J	0.186 J	0.205 J	0.173 J	0.225 J	0.170 J	0.168 J	0.283 J	0.180 J	< 0.196 U	0.256 J	0.186 J	0.141 J	0.198 J
Silver	< 0.0566 U	< 0.0550 U	< 0.0420 U	< 0.0435 U	< 0.0425 U	< 0.0498 U	< 0.0525 U	< 0.0458 U	0.0217 J	< 0.0533 U	< 0.0420 U	< 0.0516 U	< 0.0487 U	< 0.0572 U	< 0.0491 U	< 0.0446 U	< 0.0515 U	< 0.0384 U	< 0.0433 UJ
Thallium	0.239	0.234	0.180	0.175	0.163 J	0.224	0.202 J	0.237	0.181	0.191 J	0.210	0.205 J	0.187 J	0.215 J	< 0.0491 U	0.159 J	0.199 J	0.142 J	0.173 J
Vanadium	32.2	34.4	28.1	27.4	28.6	35.7	31.2	33.9	28.8	36.4	34.4	32.3	31.1 J+	35.7	10.6	30.7 J+	31.5	22.3	28.3
Zinc	54.7	53.3	29.8	222	22.7	33.8	71.9	80.0 J	69.6	34.0	34.8	31.4	42.0 J	45.0	8.84	33.9 J+	41.6	21.6	27.3
SVOCs																			
1,2,4-Trichlorobenzene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
1,2-Dichlorobenzene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
1,3-Dichlorobenzene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
1,4-Dichlorobenzene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
1-Methylnaphthalene	0.0024	0.0021	0.0057	0.095	0.0037	0.0010 J	0.042	0.018	0.046	0.0019	0.0016 J	0.0015 J	0.043	0.0076	0.13	0.0096	0.0046	0.00082 J	0.0089 J
2,4,5-Trichlorophenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2,4,6-Trichlorophenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2,4-Dichlorophenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2,4-Dimethylphenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2,4-Dinitrophenol	< 1.2 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.2 U	< 1.1 U	< 1.2 U
2,4-Dinitrotoluene	< 0.19 U	< 0.19 U	< 0.20 U	< 0.18 U	< 0.18 U	< 0.20 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.20 U	< 0.18 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.20 U
2,6-Dinitrotoluene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2-Chloronaphthalene	< 0.016 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.016 U
2-Chlorophenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2-Methylnaphthalene	0.0036	0.0052	0.0080	0.13	0.0040	0.0016 J	0.071	0.026	0.069	0.0031	0.0023	0.0023	0.069	0.011	0.21	0.014	0.0066	0.0013 J	0.013
2-Methylphenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2-Nitroaniline	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
2-Nitrophenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
3 or 4-Methylphenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	0.035 J	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
3,3-Dichlorobenzidine	< 0.39 U	< 0.39 U	< 0.39 U	< 0.36 U	< 0.37 U	< 0.41 U	< 0.38 U	< 0.39 U	< 0.38 U	< 0.38 U	< 0.37 U	< 0.37 U	< 0.37 U	< 0.39 U	< 0.36 U	< 0.38 UJ	< 0.39 U	< 0.38 U	< 0.39 U
3-Nitroaniline	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
4,6-Dinitro-2-methylphenol	< 0.58 U	< 0.58 U	< 0.59 U	< 0.55 U	< 0.55 U	< 0.61 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	< 0.55 U	< 0.56 U	< 0.55 U	< 0.59 U	< 0.55 U	< 0.57 U	< 0.59 U	< 0.57 U	< 0.59 U
4-Bromophenyl-phenylether	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
4-Chloro-3-methylphenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
4-Chloroaniline	< 0.078 U	< 0.077 U	< 0.079 U	< 0.073 U	< 0.074 U	< 0.082 U	< 0.077 U	< 0.078 U	< 0.077 U	< 0.076 U	< 0.074 U	< 0.074 U	< 0.073 U	< 0.079 U	< 0.073 U	< 0.076 UJ	< 0.079 U	< 0.075 U	< 0.079 U
4-Chlorophenyl-phenylether	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
4-Nitroaniline	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
4-Nitrophenol	< 0.58 U	< 0.58 U	< 0.59 U	< 0.55 U	< 0.55 U	< 0.61 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	< 0.55 U	< 0.56 U	< 0.55 U	< 0.59 U	< 0.55 U	< 0.57 U	< 0.59 U	< 0.57 U	< 0.59 U
Acenaphthene	< 0.0016 U	< 0.0015 U	< 0.0016 U	0.0082	< 0.0015 U	< 0.0016 U	0.0033	0.0067	0.0059 J	< 0.0015 U	< 0.0015 U	< 0.0015 U	0.46	< 0.0016 U	0.011	0.00080 J	< 0.0016 U	< 0.0015 U	< 0.0079 UJ
Acenaphthylene	< 0.0016 U	< 0.0015 U	< 0.0016 U	0.0033	0.00043 J	< 0.0016 U	0.0011 J	0.0011 J	0.0028 J	< 0.0015 U	< 0.0015 UJ	0.00039 J	0.007 J	0.00043 J	0.0049	0.00055 J	0.00098 J	< 0.0015 U	< 0.0079 U
Acetophenone	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Anthracene	0.0026	0.0012 J	0.00056 J	0.0049	< 0.0015 U	0.00048 J	0.0040	0.025	0.010	0.0059	< 0.0015 U	< 0.0015 U	1.1	0.00055 J	0.0043	0.0012 J	0.0014 J	< 0.0015 U	0.0033 J

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 2
Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB06	203-SB07	203-SB08	203-SB09	203-SB10	203-SB11	203-SB12	203-SB13	203-SB14	203-SB15	203-SB16	203-SB16	203-SB17	203-SB18	203-SB19	203-SB20	203-SB21	203-SB22	203-SB23
Sample Date	12/15/2016	12/14/2016	12/14/2016	12/13/2016	12/13/2016	12/15/2016	12/15/2016	12/14/2016	12/13/2016	12/13/2016	12/14/2016	12/14/2016	12/15/2016	12/13/2016	12/8/2016	12/13/2016	12/12/2016	12/12/2016	12/12/2016
Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	FD
Chemical																			
SVOCs Continued																			
Atrazine	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Benzaldehyde	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	0.35	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Benzo(a)anthracene	0.011	0.0080	0.0022	0.014	< 0.0015 U	0.0026	0.024	0.067	0.058	0.039	0.0012 J	0.0015 J	4.3	0.0031	0.0049	0.0098 J	0.0088	0.00079 J	0.0057 J
Benzo(a)pyrene	0.010	0.0067	0.0025	0.018	< 0.0015 U	0.0029	0.022	0.052	0.046	0.033	0.0017 J	0.0022	3.1	0.0039	0.0067	0.011 J	0.012	0.00095 J	0.0055 J
Benzo(b)fluoranthene	0.019	0.013	0.0039	0.038	< 0.0015 U	0.0052	0.042	0.083	0.083	0.059	0.0022	0.0028	4.2	0.0085	0.0096	0.019 J	0.031	0.0016 J	0.0090 J
Benzo(g,h,i)perylene	0.0039	0.0024	0.0011 J	0.0042	< 0.0015 U	0.0011 J	0.0070	0.018	0.025	0.0054	0.0014 J	0.0020 J	1.4	0.00088 J	0.0033	0.0025 J	0.0023	< 0.0015 U	< 0.0079 U
Benzo(k)fluoranthene	0.0079	0.0052	0.0016 J	0.012	< 0.0015 U	0.0024	0.017	0.038	0.032	0.026	0.00088 J	0.0011 J	1.8	0.0036	0.0037	0.0085 J	0.011	0.0010 J	< 0.0079 UJ
Benzoic acid	< 0.58 U	< 0.58 U	< 0.59 U	< 0.55 U	< 0.55 U	< 0.61 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	< 0.55 U	< 0.56 U	< 0.55 U	< 0.59 U	< 0.55 U	< 0.57 U	< 0.59 U	< 0.57 U	< 0.59 U
Benzyl Alcohol	< 0.58 U	< 0.58 U	< 0.59 U	< 0.55 U	< 0.55 U	< 0.61 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	< 0.55 U	< 0.56 U	< 0.55 U	< 0.59 U	< 0.55 U	< 0.57 U	< 0.59 U	< 0.57 U	< 0.59 U
Biphenyl, 1,1'-	< 0.039 U	< 0.039 U	< 0.039 U	0.022 J	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Bis(2-chloro-1-methylethyl) ether	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Bis(2-chloroethoxy)methane	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Bis(2-chloroethyl)ether	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Bis(2-ethylhexyl)phthalate	0.10 J	< 0.15 U	< 0.16 U	0.17 J	< 0.15 U	< 0.16 U	< 0.15 U	0.14 J	0.59	< 0.15 U	< 0.15 U	< 0.15 U	0.11 J	< 0.16 U	< 0.15 U	< 0.15 U	0.21	< 0.15 U	< 0.16 U
Butyl benzyl phthalate	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Caprolactam	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
CARBAZOLE	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	0.51	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Chrysene	0.014	0.014	0.0025	0.018	0.00038 J	0.0035	0.033	0.070	0.063	0.037	0.0016 J	0.0019	3.9	0.0043	0.0072	0.011 J	0.012	0.0013 J	0.0067 J
Dibenz(a,h)anthracene	0.0015 J	0.0011 J	< 0.0016 U	0.0017 J	< 0.0015 U	< 0.0016 U	0.0032	0.0068	0.0091 J	0.0025	< 0.0015 U	< 0.0015 U	0.54	< 0.0016 U	0.0010 J	0.00092 J	0.00099 J	< 0.0015 U	< 0.0079 U
Dibenzofuran	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	0.16	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Diethyl phthalate	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Dimethyl phthalate	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Di-n-butyl phthalate	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Di-n-octyl phthalate	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Fluoranthene	0.019	0.023	0.0042	0.025	0.0011 J	0.0058	0.047	0.18	0.10	0.078	0.0022	0.0029	7.2	0.0055	0.013	0.018 J	0.014	0.0024	0.015 J
Fluorene	0.0019 J	0.0016 J	< 0.0016 U	0.013	0.0017 J	< 0.0016 U	0.0040	0.0082	0.013	< 0.0015 U	< 0.0015 U	< 0.0015 U	0.34	0.0013 J	0.019	0.0021 J	0.0019 J	< 0.0015 U	< 0.0079 UJ
Hexachlorobenzene	< 0.016 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.016 U
Hexachlorobutadiene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
hexachlorocyclopentadiene	< 0.58 U	< 0.58 U	< 0.59 U	< 0.55 U	< 0.55 U	< 0.61 U	< 0.58 U	< 0.59 U	< 0.58 U	< 0.57 U	< 0.55 U	< 0.56 U	< 0.55 U	< 0.59 U	< 0.55 UJ	< 0.57 U	< 0.59 U	< 0.57 U	< 0.59 U
Hexachloroethane	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Indeno(1,2,3-cd)pyrene	0.0039	0.0025	0.0010 J	0.0046	< 0.0015 U	0.0012 J	0.0077	0.018	0.024	0.0067	0.00078 J	0.0010 J	1.5	0.0011 J	0.0033	0.0028 J	0.0031	< 0.0015 U	< 0.0079 U
Isophorone	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Naphthalene	0.0027	0.0048	0.0025	0.023	0.0016 J	0.0010 J	0.019	0.0089	0.019	0.00083 J	0.00099 J	0.00089 J	0.084	0.0029	0.056	0.0041	0.0025	0.0016 J	0.013 J
Nitrobenzene	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
n-Nitrosodimethylamine	< 0.19 U	< 0.19 U	< 0.20 U	< 0.18 U	< 0.18 U	< 0.20 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.19 U	< 0.18 U	< 0.19 U	< 0.18 U	< 0.20 U	< 0.18 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.20 U
n-Nitroso-di-n-propylamine	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
n-Nitrosodiphenylamine	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Pentachlorophenol	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
Phenanthrene	0.010	0.020	0.0038	0.035	0.0051	0.0027	0.022	0.097	0.053	0.018	0.0014 J	0.0016 J	3.5	0.0043	0.047	0.0084 J	0.0077	0.0026	0.018 J
Phenol	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Pyrene	0.015	0.014	0.0034	0.026	0.0011 J	0.0040	0.032	0.12	0.087	0.065	0.0019	0.0024	5.8	0.0051	0.011	0.016 J	0.014	0.0017 J	0.012 J
Tetrachlorobenzene, 1,2,4,5-	< 0.039 U	< 0.039 U	< 0.039 U	< 0.036 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.037 U	< 0.037 U	< 0.039 U	< 0.036 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U
Tetrachlorophenol, 2,3,4,6-	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.16 U
VOCs																			
1,1,1,2-Tetrachloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,1,1-Trichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,1,2,2-Tetrachloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
1,1,2-Trichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,1-Dichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,1-Dichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,2,3-Trichlorobenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 UJ	< 0.002 U	< 0.080 U	< 0.002 U
1,2,3-Trichloropropane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,2-Dibromo-3-chloropropane	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
1,2-Dibromoethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 2
Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB06	203-SB07	203-SB08	203-SB09	203-SB10	203-SB11	203-SB12	203-SB13	203-SB14	203-SB15	203-SB16	203-SB16	203-SB17	203-SB18	203-SB19	203-SB20	203-SB21	203-SB22	203-SB23
Sample Date	12/15/2016	12/14/2016	12/14/2016	12/13/2016	12/13/2016	12/15/2016	12/15/2016	12/14/2016	12/13/2016	12/13/2016	12/14/2016	12/14/2016	12/15/2016	12/13/2016	12/8/2016	12/13/2016	12/12/2016	12/12/2016	12/12/2016
Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	FD
Chemical																			
VOCs Continued																			
1,2-Dichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,2-Dichloropropane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
1,4-Dioxane	< 0.16 U	< 0.16 U	< 0.17 U	< 0.15 U	< 0.16 U	< 0.20 U	< 0.18 U	< 0.17 U	< 0.19 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.18 U	< 9.5 U	< 0.17 U	< 0.19 U	< 0.18 U	< 8.0 UJ	< 0.19 U
2-Butanone	0.004 J	< 0.007 U	< 0.007 U	< 0.006 U	< 0.006 U	< 0.008 U	0.004 J	0.005 J	< 0.008 U	< 0.006 U	< 0.006 U	< 0.006 U	< 0.007 U	< 0.38 U	< 0.007 U	< 0.008 U	0.007 J	< 0.32 U	0.004 J
2-Hexanone	< 0.007 U	< 0.007 U	< 0.007 U	< 0.006 U	< 0.006 U	< 0.008 U	< 0.007 U	< 0.007 U	< 0.008 U	< 0.006 U	< 0.006 U	< 0.006 U	< 0.007 U	< 0.38 U	< 0.007 U	< 0.008 U	< 0.007 U	< 0.32 U	< 0.008 U
4-Methyl-2-pentanone	< 0.007 UJ	< 0.007 UJ	< 0.007 UJ	< 0.006 U	< 0.006 U	< 0.008 UJ	< 0.007 UJ	< 0.007 UJ	< 0.008 U	< 0.006 U	< 0.006 UJ	< 0.006 UJ	< 0.007 UJ	< 0.38 U	< 0.007 UJ	< 0.008 U	< 0.007 U	< 0.32 U	< 0.008 U
Acetone	0.081	0.022	0.063	0.029	0.15	0.070	0.072	0.080	0.021	0.030	0.023	0.018	0.026	< 0.76 U	0.014 J	0.040	0.12	< 0.64 U	0.075 J
Benzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Bromochloromethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Bromodichloromethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Bromoform	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Bromomethane	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
Carbon disulfide	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Carbon tetrachloride	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Chlorobenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Chloroethane	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
Chloroform	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Chloromethane	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
cis-1,2-Dichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
cis-1,3-Dichloropropene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
cyclohexane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Dibromochloromethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Dichlorodifluoromethane	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
Ethylbenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Isopropylbenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
m,p-Xylene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	0.001 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Methyl tert-butyl ether	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Methylacetate	< 0.003 U	< 0.003 U	0.003 J	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	0.002 J	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 UJ
methylcyclohexane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	0.056 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Methylene chloride	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
o-Xylene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Styrene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Tetrachloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Toluene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
trans-1,2-Dichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
trans-1,3-Dichloropropene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Trichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Trichlorofluoromethane	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
Vinyl Acetate	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.003 U	< 0.004 U	< 0.19 U	< 0.003 U	< 0.004 U	< 0.004 U	< 0.16 U	< 0.004 U
Vinyl chloride	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U
Xylenes (total)	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	0.001 J	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.095 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.080 U	< 0.002 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 2
Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29	203-SB29	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	203-SB35	203-SB36	203-SB37
Sample Date	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	12/8/2016	12/8/2016	12/8/2016
Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
Chemical																
Metals																
Aluminum	12600	9550	14600	14100	13800	11200 J+	19000 J	13100 J	13100	13800	14000	3030	12500	5710	13100	6860
Antimony	< 0.157 U	< 0.196 U	< 0.194 U	< 0.190 U	< 0.180 U	< 0.161 UJ	< 0.180 U	< 0.208 U	< 0.211 U	< 0.198 U	< 0.245 U	< 0.203 U	< 0.163 U	< 0.176 U	< 0.190 U	< 0.209 U
Arsenic	3.43	2.25	2.71	3.42	3.18	3.34 J	4.45	3.47	3.37	3.77	3.38	1.44	2.94	1.17	2.80	2.31
Barium	38.1	44.8	58.4	69.8	59.3	72.2 J-	138 J	80.6 J	58.5	41.6	78.3	15.1	59.9	21.7	39.3	36.8
Beryllium	0.473	0.365	0.599	0.586	0.597	0.474	0.815 J	0.555 J	0.513	0.550	0.562	0.144 J	0.481	0.204	0.481	0.326
Cadmium	0.0511 J	< 0.0980 U	< 0.0969 U	0.0565 J	0.0537 J	< 0.0804 U	0.104 J	< 0.104 UJ	0.0493 J	< 0.0992 U	0.169 J	< 0.102 U	0.138 J	0.0404 J	< 0.0949 U	0.166 J
Chromium	16.5	13.0	21.4	22.9	20.8	21.0	34.7 J	24.2 J	18.8	17.3	22.7	5.23	19.5	7.02	17.7	9.11
Chromium(III), Insoluble Salts	16.5 J	13.0	20.9	22.3	19.1	21.0	34.7 J	21.7 J	17.9	16.9	21.6	5.2	18.8	6.6	15.1	8.1
Chromium(VI)	< 0.47 UJ	< 0.45 UJ	0.53 J-	0.55 J-	1.7 J-	< 0.46 UJ	< 0.51 UJ	2.5 J	0.91	0.42 J	1.1	< 0.43 U	0.69	0.42 J	2.6	1.0
Cobalt	5.17	3.79	6.70	7.16	6.79	6.08	11.1 J	7.11 J	5.53	5.69	7.96	1.90	5.96	2.76	5.17	3.20
Copper	9.16	7.35	12.7	15.7	12.0	12.8 J-	21.8 J	13.5 J	11.3	8.58	21.8	4.02	17.4	4.92	8.05	9.24
Iron (Fe)	14300	11200	16500	16900	15500	16400 J-	24800 J	17200 J	15900	14500	17800	7320	15100	6810	14700	8390
Lead	7.32	3.67	6.19	7.88	4.99	4.62	8.24 J	5.00 J	6.97	4.93	12.8	2.79	7.70	3.22	5.40	8.75
Manganese (Mn)	198	149	269	250	231	225 J-	364 J	244 J	203	185	308	74.0	218	105	242	158
Mercury	0.0213 J	< 0.0179 U	< 0.0197 U	< 0.0190 U	< 0.0187 U	< 0.0177 U	< 0.0192 U	< 0.0191 U	< 0.0178 U	< 0.0174 U	0.0147 J	< 0.0176 U	< 0.0178 U	< 0.0179 U	0.0145 J	< 0.0174 U
Nickel	10.0	7.22	13.3	14.0	13.0	12.7	23.5 J	15.6 J	11.2	11.4	13.7	3.26	11.9	4.63	11.3	6.64
Potassium (K)	1350	1500	2460	3000	2520	2620	5310 J	3430 J	2290	1550	3080	574	2260	817	1390	946
Selenium	0.249 J	0.148 J	0.140 J	0.125 J	0.144 J	0.0772 J	0.0796 J	< 0.208 UJ	0.149 J	0.170 J	0.156 J	< 0.203 U	0.162 J	0.0929 J	0.320 J	0.100 J
Silver	0.0258 J	< 0.0490 U	< 0.0485 U	< 0.0475 U	< 0.0450 U	< 0.0402 U	< 0.0451 U	< 0.0520 U	< 0.0527 U	< 0.0496 U	< 0.0613 U	< 0.0508 U	0.0251 J	< 0.0441 U	< 0.0474 U	< 0.0522 U
Thallium	0.162	0.125 J	0.223	0.235	0.192	0.189	0.341 J	0.248 J	0.179 J	0.176 J	0.221 J	0.0729 J	0.188	0.0478 J	0.169 J	0.0805 J
Vanadium	26.6	19.9	32.0	34.6	30.5	31.5	49.8 J	34.8 J	30.3	27.3	35.0	9.54	28.6	13.0	28.0	14.5
Zinc	29.3	16.3	37.2	40.6	35.4	29.4 J+	58.3 J	34.9 J	33.2	23.2	109	10.6	73.1	17.8	26.6	74.9
SVOCs																
1,2,4-Trichlorobenzene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
1,2-Dichlorobenzene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
1,3-Dichlorobenzene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
1,4-Dichlorobenzene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
1-Methylnaphthalene	0.0085 J	< 0.0015 U	0.0018 J	0.019	0.0018 J	0.0011 J	0.0068 J	0.0034 J	0.011	< 0.0015 U	0.0062	0.0031	0.19	1.7	0.00082 J	0.27
2,4,5-Trichlorophenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2,4,6-Trichlorophenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2,4-Dichlorophenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2,4-Dimethylphenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2,4-Dinitrophenol	< 1.2 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.2 U	< 1.2 U	< 1.1 U	< 1.1 U	< 1.3 U	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U	< 5.5 U
2,4-Dinitrotoluene	< 0.19 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.21 U	< 0.20 U	< 0.19 U	< 0.18 U	< 0.22 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.91 U
2,6-Dinitrotoluene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2-Chloronaphthalene	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.017 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.015 U	0.008 J	< 0.015 U	< 0.073 U
2-Chlorophenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2-Methylnaphthalene	0.010	< 0.0015 U	0.0028	0.025	0.0028	0.0018 J	0.0067 J	0.0043 J	0.013	< 0.0015 U	0.010	0.0061	0.26	2.5	0.0015 J	0.35
2-Methylphenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2-Nitroaniline	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
2-Nitrophenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
3 or 4-Methylphenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
3,3-Dichlorobenzidine	< 0.38 U	< 0.37 U	< 0.41 U	< 0.38 U	< 0.38 U	< 0.38 UJ	< 0.41 U	< 0.39 U	< 0.38 U	< 0.37 U	< 0.43 U	< 0.36 U	< 0.37 U	< 0.37 U	< 0.38 U	< 1.8 U
3-Nitroaniline	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 UJ	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
4,6-Dinitro-2-methylphenol	< 0.58 U	< 0.56 U	< 0.61 U	< 0.58 U	< 0.58 U	< 0.56 U	< 0.62 U	< 0.59 U	< 0.57 U	< 0.55 U	< 0.65 U	< 0.53 U	< 0.56 U	< 0.56 U	< 0.57 U	< 2.7 U
4-Bromophenyl-phenylether	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
4-Chloro-3-methylphenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
4-Chloroaniline	< 0.077 U	< 0.075 U	< 0.081 U	< 0.077 U	< 0.077 U	< 0.075 UJ	< 0.083 U	< 0.078 U	< 0.076 U	< 0.073 U	< 0.086 U	< 0.071 U	< 0.075 U	< 0.074 U	< 0.076 U	< 0.37 U
4-Chlorophenyl-phenylether	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
4-Nitroaniline	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 UJ	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
4-Nitrophenol	< 0.58 U	< 0.56 U	< 0.61 U	< 0.58 U	< 0.58 U	< 0.56 U	< 0.62 U	< 0.59 U	< 0.57 U	< 0.55 U	< 0.65 U	< 0.53 U	< 0.56 U	< 0.56 U	< 0.57 U	< 2.7 U
Acenaphthene	0.0055 J	< 0.0015 U	< 0.0016 U	0.0077 J	< 0.0015 U	< 0.0015 U	0.0072 J	0.0048 J	0.00082 J	< 0.0015 U	< 0.0017 U	0.0027	0.014 J	0.17	< 0.0015 U	0.035 J
Acenaphthylene	< 0.0077 U	< 0.0015 U	< 0.0016 U	< 0.0077 U	< 0.0015 U	< 0.0015 U	0.0016 J	0.00096 J	0.00058 J	< 0.0015 U	0.00075 J	0.0026	< 0.015 U	0.062	< 0.0015 U	0.027 J
Acetophenone	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Anthracene	0.0059 J	0.00078 J	0.0010 J	0.0049 J	0.00041 J	< 0.0015 U	0.0020 J	0.0014 J	0.00078 J	< 0.0015 U	0.0021 J	0.0032	0.019	0.058	0.00043 J	< 0.073 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 2
Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29	203-SB29	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	203-SB35	203-SB36	203-SB37
Sample Date	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	12/8/2016	12/8/2016	12/8/2016
Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
Chemical																
SVOCs Continued																
Atrazine	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Benzaldehyde	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	0.087 J	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Benzo(a)anthracene	0.011 J	0.0025	0.0024	0.011	< 0.0015 U	< 0.0015 U	0.0025 J	0.0018 J	0.0023	0.00078 J	0.011	0.0081	0.072	< 0.015 U	0.0013 J	< 0.073 U
Benzo(a)pyrene	0.010 J	0.0026	0.0029	0.016	< 0.0015 U	< 0.0015 U	0.0026 J	0.0040 J	0.0030	0.00074 J	0.012	0.010	0.057	0.004 J	0.0014 J	0.039 J
Benzo(b)fluoranthene	0.016 J	0.0041	0.0047	0.040	0.0010 J	< 0.0015 U	0.0047	0.0063	0.0062	0.0013 J	0.029	0.013	0.084	0.005 J	0.0023	0.024 J
Benzo(g,h,i)perylene	< 0.0077 U	0.0011 J	0.0015 J	0.0090 J	< 0.0015 U	< 0.0015 U	0.00091 J	0.0021 J	< 0.0015 U	< 0.0015 U	0.0028	0.0059	0.028	< 0.015 U	< 0.0015 U	0.050 J
Benzo(k)fluoranthene	0.0068 J	0.0018 J	0.0023	0.015	0.0014 J	< 0.0015 U	0.0023	0.0024	0.0022	< 0.0015 U	0.0084	0.0041	0.033	< 0.015 U	0.00085 J	0.020 J
Benzoic acid	< 0.58 U	< 0.56 U	< 0.61 U	< 0.58 U	< 0.58 U	< 0.56 U	< 0.62 U	< 0.59 U	< 0.57 U	< 0.55 U	< 0.65 U	< 0.53 U	< 0.56 U	< 0.56 U	< 0.57 U	< 2.7 U
Benzyl Alcohol	< 0.58 U	< 0.56 U	< 0.61 U	< 0.58 U	< 0.58 U	< 0.56 U	< 0.62 U	< 0.59 U	< 0.57 U	< 0.55 U	< 0.65 U	< 0.53 U	< 0.56 U	< 0.56 U	< 0.57 U	< 2.7 U
Biphenyl, 1,1'-	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	0.056	0.37	< 0.038 U	< 0.18 U
Bis(2-chloro-1-methylethyl) ether	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Bis(2-chloroethoxy)methane	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Bis(2-chloroethyl)ether	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Bis(2-ethylhexyl)phthalate	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	0.70 J	< 0.16 UJ	< 0.15 U	< 0.15 U	0.15 J	< 0.14 U	0.10 J	< 0.15 U	< 0.15 U	< 0.73 U
Butyl benzyl phthalate	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Caprolactam	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	0.045 J	< 0.15 U	< 0.15 U	< 0.73 U
CARBAZOLE	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Chrysene	0.012 J	0.0027	0.0038	0.021	0.0011 J	0.00056 J	0.0040 J	0.0029 J	0.0031	0.0010 J	0.015	0.0098	0.082	0.004 J	0.0017 J	0.024 J
Dibenz(a,h)anthracene	< 0.0077 U	< 0.0015 U	< 0.0016 U	< 0.0077 U	< 0.0015 U	< 0.0015 U	< 0.0017 U	< 0.0016 U	< 0.0015 U	< 0.0015 U	0.0011 J	0.0016 J	0.012 J	< 0.015 U	< 0.0015 U	< 0.073 U
Dibenzofuran	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	0.019 J	0.14	< 0.038 U	< 0.18 U
Diethyl phthalate	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Dimethyl phthalate	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Di-n-butyl phthalate	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Di-n-octyl phthalate	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Fluoranthene	0.033 J	0.0064	0.0065	0.040	0.0014 J	0.0012 J	0.0091 J	0.0055 J	0.0053	0.0012 J	0.019	0.018	0.11	0.013 J	0.0033	0.019 J
Fluorene	0.0065 J	0.0011 J	0.0029	0.0082 J	< 0.0015 U	< 0.0015 U	0.0077 J	0.0052 J	0.0028	< 0.0015 U	0.0018 J	0.0024	0.027	0.24	< 0.0015 U	0.062 J
Hexachlorobenzene	< 0.015 U	< 0.015 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.017 U	< 0.016 U	< 0.015 U	< 0.015 U	< 0.017 U	< 0.014 U	< 0.015 U	< 0.015 U	< 0.015 U	< 0.073 U
Hexachlorobutadiene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
hexachlorocyclopentadiene	< 0.58 U	< 0.56 U	< 0.61 U	< 0.58 U	< 0.58 U	< 0.56 UJ	< 0.62 U	< 0.59 U	< 0.57 U	< 0.55 U	< 0.65 U	< 0.53 UJ	< 0.56 U	< 0.56 U	< 0.57 UJ	< 2.7 U
Hexachloroethane	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Indeno(1,2,3-cd)pyrene	< 0.0077 U	0.0012 J	0.0014 J	0.0092 J	< 0.0015 U	< 0.0015 U	0.00092 J	0.0020 J	0.00077 J	< 0.0015 U	0.0032	0.0049	0.028	< 0.015 U	< 0.0015 U	0.019 J
Isophorone	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Naphthalene	0.0072 J	0.0014 J	0.0021	0.022	0.0014 J	0.00096 J	0.0050 J	0.012 J	0.0018 J	< 0.0015 U	0.0049	0.013	0.058	0.69	0.0025	0.10
Nitrobenzene	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
n-Nitrosodimethylamine	< 0.19 U	< 0.19 U	< 0.20 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.21 U	< 0.20 U	< 0.19 U	< 0.18 U	< 0.22 U	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.91 U
n-Nitroso-di-n-propylamine	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
n-Nitrosodiphenylamine	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Pentachlorophenol	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
Phenanthrene	0.035 J	0.0035	0.0064	0.037	0.00092 J	0.0019	0.021 J	0.015 J	0.0092	0.00098 J	0.011	0.012	0.081	0.43	0.0021	0.099
Phenol	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Pyrene	0.025 J	0.0044	0.0045	0.034	0.0010 J	0.00089 J	0.0097 J	0.0057 J	0.0045	0.0010 J	0.019	0.017	0.11	0.032	0.0023	0.028 J
Tetrachlorobenzene, 1,2,4,5-	< 0.038 U	< 0.037 U	< 0.041 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.038 U	< 0.037 U	< 0.043 U	< 0.036 U	< 0.037 U	< 0.037 U	< 0.038 U	< 0.18 U
Tetrachlorophenol, 2,3,4,6-	< 0.15 U	< 0.15 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.16 U	< 0.15 U	< 0.15 U	< 0.17 U	< 0.14 U	< 0.15 U	< 0.15 U	< 0.15 U	< 0.73 U
VOCs																
1,1,1,2-Tetrachloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,1,1-Trichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,1,2,2-Tetrachloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
1,1,2-Trichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,1-Dichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,1-Dichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,2,3-Trichlorobenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,2,3-Trichloropropane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,2-Dibromo-3-chloropropane	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
1,2-Dibromoethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 2
Unbiased (Phase II) Surface Soil Results (0 to 1 ft bgs) at the former Building 203 AOC
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	203-SB23	203-SB24	203-SB25	203-SB26	203-SB27	203-SB28	203-SB29	203-SB29	203-SB30	203-SB31	203-SB32	203-SB33	203-SB34	203-SB35	203-SB36	203-SB37
Sample Date	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/8/2016	12/12/2016	12/8/2016	12/8/2016	12/8/2016
Depth Interval	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft
Sample Type	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
Chemical																
VOCs Continued																
1,2-Dichloroethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,2-Dichloropropane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
1,4-Dioxane	< 0.20 U	< 0.17 U	< 0.18 U	< 0.17 U	< 0.19 U	< 0.15 U	< 0.20 U	< 0.17 U	< 0.17 U	< 7.9 UJ	< 0.18 U	< 0.19 U	< 0.19 U	< 0.19 U	< 0.16 U	< 9.9 UJ
2-Butanone	< 0.008 UJ	< 0.007 U	< 0.007 U	0.005 J	< 0.008 U	< 0.006 U	0.007 J	< 0.007 UJ	0.003 J	< 0.32 U	0.004 J	< 0.008 U	0.004 J	< 0.008 U	< 0.007 U	< 0.40 U
2-Hexanone	< 0.008 U	< 0.007 U	< 0.007 U	< 0.007 U	< 0.008 U	< 0.006 U	< 0.008 U	< 0.007 U	< 0.007 U	< 0.32 U	< 0.007 U	< 0.008 U	< 0.008 U	< 0.008 U	< 0.007 U	< 0.40 U
4-Methyl-2-pentanone	< 0.008 U	< 0.007 U	< 0.007 U	< 0.007 U	< 0.008 U	< 0.006 U	< 0.008 U	< 0.007 U	< 0.007 U	< 0.32 U	< 0.007 U	< 0.008 UJ	< 0.008 U	< 0.008 UJ	< 0.007 UJ	< 0.40 U
Acetone	0.052 J	0.036	0.041	0.073	0.042	0.032 J	0.094 J	0.040 J	0.063	< 0.63 U	0.083	0.013 J	0.070	0.027	0.020	< 0.79 U
Benzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.001 J	< 0.002 U	< 0.099 U
Bromochloromethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Bromodichloromethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Bromoform	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Bromomethane	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
Carbon disulfide	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Carbon tetrachloride	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Chlorobenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Chloroethane	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
Chloroform	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Chloromethane	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
cis-1,2-Dichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
cis-1,3-Dichloropropene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
cyclohexane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.002 J	< 0.002 U	< 0.099 U
Dibromochloromethane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Dichlorodifluoromethane	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
Ethylbenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.007	< 0.002 U	< 0.099 U
Isopropylbenzene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.002 J	< 0.002 U	< 0.099 U
m,p-Xylene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.011	< 0.002 U	< 0.099 U
Methyl tert-butyl ether	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Methylacetate	0.016 J	< 0.003 U	< 0.004 U	0.005	< 0.004 U	0.004	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	27
methylcyclohexane	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.007	< 0.002 U	< 0.099 U
Methylene chloride	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
o-Xylene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.009	< 0.002 U	< 0.099 U
Styrene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Tetrachloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Toluene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.005 J	< 0.002 U	< 0.099 U
trans-1,2-Dichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
trans-1,3-Dichloropropene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Trichloroethene	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Trichlorofluoromethane	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
Vinyl Acetate	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.004 U	< 0.003 U	< 0.003 U	< 0.16 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.003 U	< 0.20 U
Vinyl chloride	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.099 U
Xylenes (total)	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.001 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.079 U	< 0.002 U	< 0.002 U	< 0.002 U	0.020	< 0.002 U	< 0.099 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
ft - feet.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-034	CH-AOC-2010	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH
Location ID	034-SB01	2010-SB02	203-SB01	203-SB02	203-SB03	203-SB04	203-SB05	AST35-SB01	AST35-SB02	AST35-SB03	AST35-SB03	AST35-SB04	EFO-SB01	F100C-SB01	F100C-SB02	FPH-SB01	FPH-SB02	FPH-SB03
Sample Date	6/19/2016	6/12/2016	6/20/2016	6/20/2016	6/20/2016	6/20/2016	6/20/2016	6/16/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/22/2016	6/12/2016	6/12/2016	6/14/2016	6/13/2016	6/13/2016
Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical																		
Explosives																		
1,3,5-Trinitrobenzene													< 0.11 U					
1,3-Dinitrobenzene													< 0.11 U					
2,4,6-Trinitrotoluene													< 0.11 U					
2,4-Dinitrotoluene													< 0.11 U					
2,6-Dinitrotoluene													< 0.11 U					
2-Amino-4,6-dinitrotoluene													< 0.11 U					
2-Nitrotoluene													< 0.11 U					
3-Nitrotoluene													< 0.11 U					
4-Amino-2,6-Dinitro Toluene													< 0.11 U					
4-Nitrotoluene													< 0.11 U					
Hexahydro-1,3,5-trinitro-1,3,5-triazine													< 0.11 U					
Methyl-2,4,6-trinitrophenylnitramine													< 0.11 U					
Nitrobenzene													< 0.11 U					
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine													< 0.11 U					
Metals																		
Aluminum	430000		19000	49000	4700	590	4100											
Antimony	1.2 J		0.23 J	1.1 J	0.40 J	0.25 J	0.24 J											
Arsenic	19		5.3	4.9	1.7	2.1	5.3											
Barium	740		150	490	85	76	100											
Beryllium	8.1		0.28 J	2.2	0.42 J	< 0.50 U	0.35 J											
Cadmium	1.7		< 0.50 U	0.90 J	< 0.50 U	< 0.50 U	< 0.50 U											
Calcium (Ca)	38000		6600	15000	17000	22000	52000											
Chromium	340		31	100	8.1 J	1.8 J	6.9 J											
Cobalt	51		9.4	32	2.9 J	0.66 J	3.4 J											
Copper	110		19	80	8.1	1.8 J	5.9											
Iron (Fe)	100000		21000	62000	5200	950	59000											
Lead	88	23	7.1	17	2.4	0.52 J	2.6							88	33			
Magnesium (Mg)	14000		7300	26000	14000	22000	39000											
Manganese (Mn)	2900		770	1100	400	470	6000											
Nickel	150		19	75	6.4 J	2.2 J	6.9 J											
Potassium (K)	9400		5200	20000	5500	4700	5600											
Selenium	11		2.5 J	< 2.5 U	2.2 J	3.4 J	< 2.5 U											
Silver	0.74 J		< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U											
Sodium (Na)	15000		12000	27000	38000	52000	25000											
Thallium	1.3 J		0.42 J	0.89 J	0.70 J	< 0.50 U	< 0.50 U											
Vanadium	160		35	140	13	2.7 J	10											
Zinc	310		67	180	20 J	6.2 J	25 J											
PCBs																		
Aroclor 1016	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													
Aroclor 1221	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													
Aroclor 1232	< 0.038 UJ		< 0.042 U	< 0.041 UJ	< 0.042 UJ													
Aroclor 1242	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													
Aroclor 1248	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													
Aroclor 1254	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													
Aroclor 1260	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													
Aroclor 1262	< 0.093 UJ		< 0.10 U	< 0.10 UJ	< 0.10 UJ													
Aroclor 1268	< 0.037 UJ		< 0.041 U	< 0.040 UJ	< 0.041 UJ													

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-034	CH-AOC-2010	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH
Location ID	034-SB01	2010-SB02	203-SB01	203-SB02	203-SB03	203-SB04	203-SB05	AST35-SB01	AST35-SB02	AST35-SB03	AST35-SB03	AST35-SB04	EFO-SB01	F100C-SB01	F100C-SB02	FPH-SB01	FPH-SB02	FPH-SB03
Sample Date	6/19/2016	6/12/2016	6/20/2016	6/20/2016	6/20/2016	6/20/2016	6/20/2016	6/16/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/22/2016	6/12/2016	6/12/2016	6/14/2016	6/13/2016	6/13/2016
Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical																		
SVOCs																		
1,2,4-Trichlorobenzene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
1,2-Dichlorobenzene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
1,3-Dichlorobenzene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
1,4-Dichlorobenzene			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
1-Methylnaphthalene	0.11 J+		0.054	< 0.019 U	< 0.019 U	0.029	780	0.24	0.034	48 J	140 J	0.78				0.55 J+	81	440
2,4,5-Trichlorophenol			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 U	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U				< 2.4 U	< 0.48 U	< 0.47 U
2,4,6-Trichlorophenol			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 U	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 U				< 0.95 U	< 0.48 U	< 0.47 U
2,4-Dichlorophenol			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 U	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U				< 2.4 U	< 0.48 U	< 0.47 U
2,4-Dimethylphenol			< 1.0 U	< 2.4 U	< 2.4 U	< 2.9 U	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U				< 2.4 U	< 0.96 U	< 0.94 U
2,4-Dinitrophenol			< 10 U	< 9.4 U	< 9.4 U	< 11 U	< 17 U	< 9.5 U	< 9.4 U	< 9.5 U	< 9.4 U	< 9.7 U				< 9.5 U	< 9.6 U	< 9.4 U
2,4-Dinitrotoluene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
2,6-Dinitrotoluene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
2-Chloronaphthalene			< 1.0 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.96 UJ	< 0.94 UJ
2-Chlorophenol			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 U	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 U				< 0.95 U	< 0.48 U	< 0.47 U
2-Methylnaphthalene	0.20 J+		0.072	< 0.019 U	0.035	0.042	710	0.57	0.045	38 J	< 0.019 UJ	0.35				0.35 J+	130	450
2-Methylphenol			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 U	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 U				< 0.95 U	< 0.48 U	< 0.47 U
2-Nitroaniline			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
2-Nitrophenol			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 U	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U				< 2.4 U	< 0.48 U	< 0.47 U
3,3-Dichlorobenzidine			< 10 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 9.6 UJ	< 9.4 UJ
3,4-Methylphenol			< 1.0 U	< 4.7 U	< 4.7 U	< 5.7 U	< 8.6 U	< 4.8 U	< 4.7 U	< 4.8 U	< 4.7 U	< 4.9 U				< 4.8 U	< 0.96 U	< 0.94 U
3-Nitroaniline			< 1.0 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.96 UJ	< 0.94 UJ
4,6-Dinitro-2-methylphenol			< 2.5 U	< 0.94 U	< 0.94 U	< 1.1 U	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 U				< 0.95 U	< 2.4 U	< 2.4 U
4-Bromophenyl-phenylether			< 2.5 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 2.4 UJ	< 2.4 UJ
4-Chloro-3-methylphenol			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 U	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U				< 2.4 U	< 0.48 U	< 0.47 U
4-Chloroaniline			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 U	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 U				< 0.95 U	< 0.48 U	< 0.47 U
4-Chlorophenyl-phenylether			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
4-Nitroaniline			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
4-Nitrophenol			< 10 UJ	< 2.4 U	< 2.4 U	< 2.9 U	< 4.3 U	< 2.4 UJ	< 2.4 UJ	< 2.4 UJ	< 2.4 UJ	< 2.4 U				< 2.4 UJ	< 9.6 UJ	< 9.4 UJ
Acenaphthene	< 0.019 U		0.18	< 0.019 U	< 0.019 U	< 0.020 U	0.22 J	0.085	< 0.019 U	3.2 J	21 J	0.073				3.8	10 J-	< 0.14 UJ
Acenaphthylene	< 0.019 U		< 0.020 U	< 0.019 U	< 0.019 U	< 0.020 U	9.7	0.038	< 0.019 U	0.40 J	4.7 J	0.024				0.078	< 0.14 UJ	< 0.14 UJ
Anthracene	< 0.019 U		0.023	< 0.019 U	< 0.019 U	< 0.020 U	0.21 J	0.023	< 0.019 U	0.44 J	12 J	< 0.019 U				0.029 J+	1.5 J-	< 0.14 UJ
Benzo(a)anthracene	< 0.019 U		< 0.020 U	< 0.019 U	< 0.019 U	< 0.020 U	3.4	< 0.019 U	< 0.019 U	< 0.023 UJ	1.1 J	< 0.019 U				< 0.019 U	< 0.14 UJ	0.64 J-
Benzo(a)pyrene	< 0.019 U		< 0.020 U	< 0.019 U	< 0.019 U	< 0.020 U	0.93 J	< 0.019 U	< 0.019 U	< 0.023 UJ	0.44 J	< 0.019 U				< 0.019 U	< 0.14 UJ	0.26 J-
Benzo(b)fluoranthene	0.037 J+		< 0.020 U	0.019	< 0.019 U	< 0.020 U	2.7	< 0.019 U	< 0.019 U	< 0.023 UJ	0.78 J	< 0.019 U				< 0.019 U	< 0.14 UJ	0.38 J-
Benzo(g,h,i)perylene	< 0.019 U		< 0.020 U	< 0.019 U	< 0.019 U	< 0.020 U	0.48 J	< 0.019 U	< 0.019 U	< 0.023 UJ	0.17 J	< 0.019 U				< 0.019 U	< 0.14 UJ	< 0.14 UJ
Benzo(k)fluoranthene	< 0.019 U		< 0.020 U	< 0.019 UJ	< 0.019 UJ	< 0.020 UJ	0.57 J	< 0.019 U	< 0.019 U	< 0.023 UJ	0.23 J	< 0.019 U				< 0.019 U	< 0.14 UJ	0.12 J
Benzoic acid			< 10 UJ	< 2.4 UJ	5.3 J	< 2.9 UJ	< 4.3 UJ	< 2.4 UJ	< 2.4 UJ	< 2.4 UJ	< 2.4 UJ	< 2.4 UJ				16 J	< 9.6 UJ	< 9.4 UJ
Benzyl Alcohol			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
Bis(2-chloro-1-methylethyl) ether			< 0.50 UJ	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 UJ	< 2.4 UJ	< 2.4 UJ	< 2.4 U				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
Bis(2-chloroethoxy)methane			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
Bis(2-chloroethyl)ether			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
Bis(2-ethylhexyl)phthalate			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Butyl benzyl phthalate			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
CARBAZOLE			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	13	< 0.95 U	< 0.94 U	1.8 J	1.6 J	< 0.97 UJ				< 0.95 UJ	1.8 J	< 0.47 UJ
Chrysene	< 0.019 U		< 0.020 U	0.027	< 0.019 U	< 0.020 U	2.3	< 0.019 U	< 0.019 U	< 0.023 UJ	0.72 J	< 0.019 U				< 0.019 U	< 0.14 UJ	0.68 J-
Dibenz(a,h)anthracene	< 0.019 U		< 0.020 U	< 0.019 U	< 0.019 U	< 0.020 U	0.22 J	< 0.019 U	< 0.019 U	< 0.023 UJ	0.089 J	< 0.019 U				< 0.019 U	< 0.14 UJ	< 0.14 UJ
Dibenzofuran			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Diethyl phthalate			0.19 J	< 0.94 U	< 0.94 U	0.86 J	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Dimethyl phthalate			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Di-n-butyl phthalate			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Di-n-octyl phthalate			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
Fluoranthene	0.035 J+		0.091	0.027	< 0.019 U	< 0.020 U	10	0.035	< 0.019 U	0.062 J	3.1 J	< 0.019 U				0.021	0.70 J-	4.3 J-
Fluorene	0.071 J+		0.18	< 0.019 U	< 0.019 U	< 0.020 U	120	0.21	< 0.019 U	2.6 J	23 J	0.12				2.0 J+	11 J-	< 0.14 UJ
Hexachlorobenzene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Hexachlorobutadiene			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Hexachloroethane			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-034	CH-AOC-2010	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-AST35	CH-AOC-EFO	CH-AOC-F100C	CH-AOC-F100C	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-FPH
Location ID	034-SB01	2010-SB02	203-SB01	203-SB02	203-SB03	203-SB04	203-SB05	AST35-SB01	AST35-SB02	AST35-SB03	AST35-SB03	AST35-SB04	EFO-SB01	F100C-SB01	F100C-SB02	FPH-SB01	FPH-SB02	FPH-SB03
Sample Date	6/19/2016	6/12/2016	6/20/2016	6/20/2016	6/20/2016	6/20/2016	6/20/2016	6/16/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/22/2016	6/12/2016	6/12/2016	6/14/2016	6/13/2016	6/13/2016
Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
Chemical																		
SVOCs Continued																		
Indeno(1,2,3-cd)pyrene	< 0.019 U		< 0.020 U	< 0.019 U	< 0.019 U	< 0.020 U	0.40 J	< 0.019 U	< 0.019 U	< 0.023 UJ	0.17 J	< 0.019 U				< 0.019 U	< 0.14 UJ	< 0.14 UJ
Isophorone			< 1.0 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.96 UJ	< 0.94 UJ
Naphthalene	0.095 J+		0.032	0.022	0.028	0.029	450	0.21	0.043	34 J	53 J	0.24				0.40 J+	44 J-	130
Nitrobenzene			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
n-Nitrosodimethylamine			< 0.50 UJ	< 0.94 UJ	< 0.94 UJ	< 1.1 UJ	< 1.7 UJ	< 0.95 UJ	< 0.94 UJ	< 0.95 UJ	< 0.94 UJ	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
n-Nitroso-di-n-propylamine			< 0.50 U	< 2.4 U	< 2.4 U	< 2.9 UJ	< 4.3 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 U	< 2.4 UJ				< 2.4 UJ	< 0.48 UJ	< 0.47 UJ
n-Nitrosodiphenylamine			< 0.50 U	< 0.94 U	< 0.94 U	< 1.1 UJ	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Pentachlorophenol			< 2.5 UJ	< 0.94 U	< 0.94 U	< 1.1 U	< 1.7 U	< 0.95 U	< 0.94 U	< 0.95 U	< 0.94 U	< 0.97 U				< 0.95 U	< 2.4 U	< 2.4 U
Phenanthrene	0.051 J+		0.23	0.057	0.030	0.027	220	0.27	0.025	5.0 J	56 J	0.17				0.082 J+	22 J-	130
Phenol			< 0.50 UJ	< 0.94 UJ	< 0.94 UJ	< 1.1 UJ	< 1.7 UJ	< 0.95 UJ	< 0.94 UJ	< 0.95 UJ	< 0.94 UJ	< 0.97 UJ				< 0.95 UJ	< 0.48 UJ	< 0.47 UJ
Pyrene	0.031 J+		0.061	0.025	< 0.019 U	< 0.020 U	16	0.034	< 0.019 U	0.10 J	3.7 J	< 0.019 U				< 0.019 U	1.4 J-	8.5 J-
VOCs																		
1,1,1,2-Tetrachloroethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 U	< 0.60 U	< 0.60 U
1,1,1-Trichloroethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,1,2,2-Tetrachloroethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,1,2-Trichloroethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,1-Dichloroethane			< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U				< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,2,3-Trichloropropane			< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dibromo-3-chloropropane			< 2.0 U	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U				< 2.0 U	< 2.0 U	< 2.0 U
1,2-Dibromoethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dichloroethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dichloropropane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
2-Butanone			< 5.0 U	< 5.0 U	< 5.0 U	3.8 J	16	5.0 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U				9.3 J	< 5.0 U	< 5.0 U
2-Hexanone			< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U				< 1.0 UJ	< 1.0 U	< 1.0 UJ
Acetone			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	19	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Benzene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	23	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	1.1	1.1
Bromodichloromethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 U	< 0.60 U	< 0.60 U
Bromoform			< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 UJ	< 0.60 U	< 0.60 UJ
Carbon disulfide			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				0.96 J	0.77 J	0.98 J
Carbon tetrachloride			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Chlorobenzene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Chloroethane			< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U				< 1.0 U	< 1.0 U	< 1.0 U
Chloroform			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Chloromethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ				< 0.60 U	< 0.60 U	< 0.60 U
cis-1,2-Dichloroethene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	6.0	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
cis-1,3-Dichloropropene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 UJ	< 0.60 U	< 0.60 UJ
Dibromochloromethane			< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 UJ	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 UJ	< 0.60 U	< 0.60 UJ
Dichlorodifluoromethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Ethylbenzene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	70	< 0.60 U	< 0.60 UJ	7.2 J	2.8 J	< 0.60 U				< 0.60 UJ	18	31 J-
Methylene chloride			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Styrene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 UJ	< 0.60 U	< 0.60 UJ
Tetrachloroethene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Toluene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	0.61 J
trans-1,2-Dichloroethene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
trans-1,3-Dichloropropene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Trichloroethene			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Trichlorofluoromethane			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ				< 0.60 U	< 0.60 U	< 0.60 U
Vinyl Acetate			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Vinyl chloride			< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U				< 0.60 U	< 0.60 U	< 0.60 U
Xylenes (total)			< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	47	< 1.8 U	< 1.8 UJ	2.5 J	< 1.8 UJ	< 1.8 UJ				< 1.8 UJ	10	56 J-

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Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-H11	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H21	CH-AOC-H21	CH-AOC-H21	CH-AOC-H4	CH-AOC-H4	CH-AOC-H4	CH-AOC-H4	CH-AOC-H6	CH-AOC-H6	CH-AOC-H6
Location ID	FPH-SB04	FPH-SB04	H11-SB01	H11-SB02	H12-SB01	H14-SB01	H14-SB03	H16-SB01	H17-SB02	H17-SB03	H21-SB01	H21-SB02	H21-SB03	H4-SB01	H4-SB01	H4-SB02	H4-SB03	H6-SB01	H6-SB01	H6-SB02
Sample Date	6/13/2016	6/13/2016	6/8/2016	6/7/2016	6/9/2016	6/21/2016	6/21/2016	6/19/2016	6/21/2016	6/21/2016	6/14/2016	6/19/2016	6/19/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
Sample Type	FD	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N
Chemical																				
Explosives																				
1,3,5-Trinitrobenzene																				
1,3-Dinitrobenzene																				
2,4,6-Trinitrotoluene																				
2,4-Dinitrotoluene																				
2,6-Dinitrotoluene																				
2-Amino-4,6-dinitrotoluene																				
2-Nitrotoluene																				
3-Nitrotoluene																				
4-Amino-2,6-Dinitro Toluene																				
4-Nitrotoluene																				
Hexahydro-1,3,5-trinitro-1,3,5-triazine																				
Methyl-2,4,6-trinitrophenylnitramine																				
Nitrobenzene																				
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine																				
Metals																				
Aluminum			39000	10000	1100 J+	5000	3200	110000	160000	36000	4700 J+	140000	65000							
Antimony			< 0.75 U	< 0.75 U	< 0.75 U	< 0.75 U	< 0.75 U	0.68 J	0.62 J	2.1 J	< 0.75 U	0.60 J	0.34 J							
Arsenic			120	2.7	8.7	1.5	0.73 J	5.4	12	7.8	< 1.0 U	14	3.8							
Barium			340	64	38	54	57	250	970	440	57	1600	390							
Beryllium			< 10 U	< 10 U	< 0.50 U	0.46 J	< 0.50 U	2.3	5.3	2.1	< 0.50 U	6.5	2.6							
Cadmium			0.45 J	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	1.2	1.5	0.57 J	< 0.50 U	1.4	0.86 J							
Calcium (Ca)			13000 J	45000	48000 J+	7000	9600	16000	17000	9200	5000	13000	18000							
Chromium			180 J	17	2.0 J	11	13	84	350	180	6.3 J	180	95							
Cobalt			20 J	8.2	1.8 J	6.8	2.5 J	12	97	30	6.8	99	27							
Copper			100	7.0	1.5 J	6.3	6.3	52	280	85	4.1 J	150	82							
Iron (Fe)			180000	50000	37000 J+	8200	4800	23000	180000	57000	4700	130000	54000							
Lead			41	7.3	3.8	3.2	1.6	55	68	28	2.1	55	35	23 J	52 J	33	22	19 J	33 J	20
Magnesium (Mg)			9800 J	7300	6800	5100	6500	8300	46000	8500	4500 J-	31000	14000							
Manganese (Mn)			1300	2100	1400 J+	2000	420	440	2200	3100	830	5700	530							
Nickel			56 J	7.5 J	3.0 J	10	6.2 J	34	230	58	9.8 J	140	62							
Potassium (K)			7400 J	10000	8200 J+	3500	4800	3800	41000	7000	3000	17000	8400							
Selenium			1.9 J	< 2.5 U	< 2.5 U	1.7 J	< 2.5 U	4.4 J	3.3 J	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U							
Silver			0.57 J	< 0.50 U	0.30 J	< 0.50 U	< 0.50 U	0.74 J	0.71 J	< 0.50 U	< 0.50 U	0.43 J	0.29 J							
Sodium (Na)			10000	9600 J	11000 J+	22000	31000	29000	21000	16000	21000 J-	25000	20000							
Thallium			0.91 J	< 0.50 U	< 0.50 U	0.17 J	< 0.50 U	0.59 J	3.0	0.82 J	< 0.50 U	1.3 J	0.94 J							
Vanadium			130	25	3.6 J	10	7.5	67	380	77	7.7	160	100							
Zinc			90	22 J	8.8 J	13 J	20 J	210	1200	560	11 J	290	150							
PCBs																				
Aroclor 1016			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U
Aroclor 1221			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U
Aroclor 1232			< 0.040 U	< 0.040 U	< 0.039 U			< 0.038 UJ	< 0.043 UJ	< 0.044 U	< 0.041 U	< 0.039 U	< 0.040 U	< 0.039 U	< 0.039 U	< 0.038 U	< 0.039 UJ	< 0.039 U	< 0.039 U	< 0.039 U
Aroclor 1242			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U
Aroclor 1248			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U
Aroclor 1254			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U
Aroclor 1260			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U
Aroclor 1262			< 0.098 U	< 0.098 U	< 0.094 U			< 0.093 UJ	< 0.11 UJ	< 0.11 U	< 0.10 U	< 0.096 U	< 0.097 U	< 0.094 U	< 0.094 U	< 0.093 U	< 0.094 UJ	< 0.094 U	< 0.094 U	< 0.094 U
Aroclor 1268			< 0.039 U	< 0.039 U	< 0.038 U			< 0.037 UJ	< 0.042 UJ	< 0.043 U	< 0.040 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.038 U	< 0.037 U	< 0.038 UJ	< 0.038 U	< 0.038 U	< 0.038 U

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Location ID	FPH-SB04	FPH-SB04	H11-SB01	H11-SB02	H12-SB01	H14-SB01	H14-SB03	H16-SB01	H17-SB02	H17-SB03	H21-SB01	H21-SB02	H21-SB03	H4-SB01	H4-SB01	H4-SB02	H4-SB03	H6-SB01	H6-SB01	H6-SB02
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Sample Type	FD	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N
Chemical																				
SVOCs																				
1,2,4-Trichlorobenzene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
1,2-Dichlorobenzene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
1,3-Dichlorobenzene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
1,4-Dichlorobenzene	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
1-Methylnaphthalene	110 J	180 J	0.056	5.1	12 J-	0.039 J-	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.026 J+	< 0.019 U	< 0.019 U							
2,4,5-Trichlorophenol	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
2,4,6-Trichlorophenol	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
2,4-Dichlorophenol	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
2,4-Dimethylphenol	< 0.95 U	< 0.94 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.97 U	< 2.4 U	< 2.4 U							
2,4-Dinitrophenol	< 9.5 U	< 9.4 U			< 9.3 U			< 9.4 U	< 11 UJ	< 11 U	< 9.7 U	< 9.7 U	< 9.5 U							
2,4-Dinitrotoluene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
2,6-Dinitrotoluene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
2-Chloronaphthalene	< 0.95 U	< 0.94 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.97 U	< 0.97 U	< 0.95 U							
2-Chlorophenol	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
2-Methylnaphthalene	190 J	310 J	0.11	5.3	12 J	0.048 J-	0.032	< 3.8 U	< 0.068 UJ	< 0.022 U	0.041 J+	< 0.019 U	< 0.019 U							
2-Methylphenol	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
2-Nitroaniline	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
2-Nitrophenol	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
3,3-Dichlorobenzidine	< 9.5 U	< 9.4 U			< 2.3 UJ			< 2.4 U	< 2.8 UJ	< 2.7 U	< 9.7 U	< 2.4 U	< 2.4 U							
3,4-Methylphenol	< 0.95 U	< 0.94 U			< 4.7 U			< 4.7 U	< 5.7 UJ	< 5.5 U	< 0.97 U	< 4.9 U	< 4.8 U							
3-Nitroaniline	< 0.95 U	< 0.94 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.97 U	< 0.97 U	< 0.95 U							
4,6-Dinitro-2-methylphenol	< 2.4 U	< 2.4 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 2.4 U	< 0.97 U	< 0.95 U							
4-Bromophenyl-phenylether	< 2.4 U	< 2.4 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 2.4 U	< 0.97 U	< 0.95 U							
4-Chloro-3-methylphenol	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
4-Chloroaniline	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
4-Chlorophenyl-phenylether	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
4-Nitroaniline	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
4-Nitrophenol	< 9.5 UJ	< 9.4 UJ			< 2.3 UJ			< 2.4 UJ	< 2.8 UJ	< 2.7 U	< 9.7 UJ	< 2.4 UJ	< 2.4 UJ							
Acenaphthene	9.2 J	14 J	0.023	4.5	11 J-	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	< 0.020 U	< 0.019 U	< 0.019 U							
Acenaphthylene	< 0.14 U	< 0.14 U	< 0.020 U	1.8	0.39	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	< 0.020 U	< 0.019 U	< 0.019 U							
Anthracene	< 0.14 U	< 0.14 U	< 0.020 U	5.8	0.28 J-	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	< 0.020 U	< 0.019 U	< 0.019 U							
Benzo(a)anthracene	< 0.14 UJ	0.23 J	< 0.020 U	27	0.026	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.059 J+	< 0.019 U	< 0.019 U							
Benzo(a)pyrene	< 0.14 U	< 0.14 U	< 0.020 U	20	< 0.019 UJ	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.039 J+	< 0.019 U	< 0.019 U							
Benzo(b)fluoranthene	< 0.14 U	< 0.14 U	< 0.020 U	30	0.027 J	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.074 J+	< 0.019 U	< 0.019 U							
Benzo(g,h,i)perylene	< 0.14 U	< 0.14 U	< 0.020 U	14	< 0.019 UJ	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	< 0.020 U	< 0.019 U	< 0.019 U							
Benzo(k)fluoranthene	< 0.14 U	< 0.14 U	< 0.020 U	8.0 J	< 0.019 UJ	< 0.021 UJ	< 0.022 UJ	< 3.8 U	< 0.068 UJ	< 0.022 UJ	0.037 J+	< 0.019 U	< 0.019 U							
Benzoic acid	< 9.5 UJ	< 9.4 UJ			< 2.3 U			9.4 J	< 2.8 UJ	< 2.7 UJ	< 9.7 UJ	< 2.4 UJ	< 2.4 UJ							
Benzyl Alcohol	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
Bis(2-chloro-1-methylethyl) ether	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 UJ	< 2.4 U	< 2.4 U							
Bis(2-chloroethoxy)methane	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
Bis(2-chloroethyl)ether	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
Bis(2-ethylhexyl)phthalate	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Butyl benzyl phthalate	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
CARBAZOLE	< 0.48 U	< 0.47 U			3.3 J			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Chrysene	< 0.14 UJ	0.11 J	< 0.020 U	18	0.024	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.049 J+	< 0.019 U	< 0.019 U							
Dibenz(a,h)anthracene	< 0.14 U	< 0.14 U	< 0.020 U	4.1	< 0.019 UJ	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	< 0.020 U	< 0.019 U	< 0.019 U							
Dibenzofuran	< 0.48 UJ	9.5 J			4.2			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Diethyl phthalate	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	1.3 J	0.49 J	< 0.97 U	0.94 J							
Dimethyl phthalate	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Di-n-butyl phthalate	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Di-n-octyl phthalate	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
Fluoranthene	0.58 J	1.0 J	0.028	42	0.73 J-	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.060 J+	< 0.019 U	0.027							
Fluorene	11 J	19 J	0.048	6.7	5.5 J-	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.025 J+	< 0.019 U	< 0.019 U							
Hexachlorobenzene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Hexachlorobutadiene	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Hexachloroethane	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-FPH	CH-AOC-FPH	CH-AOC-H11	CH-AOC-H11	CH-AOC-H12	CH-AOC-H14	CH-AOC-H14	CH-AOC-H16	CH-AOC-H17	CH-AOC-H17	CH-AOC-H21	CH-AOC-H21	CH-AOC-H21	CH-AOC-H4	CH-AOC-H4	CH-AOC-H4	CH-AOC-H4	CH-AOC-H6	CH-AOC-H6	CH-AOC-H6
Location ID	FPH-SB04	FPH-SB04	H11-SB01	H11-SB02	H12-SB01	H14-SB01	H14-SB03	H16-SB01	H17-SB02	H17-SB03	H21-SB01	H21-SB02	H21-SB03	H4-SB01	H4-SB01	H4-SB02	H4-SB03	H6-SB01	H6-SB01	H6-SB02
Sample Date	6/13/2016	6/13/2016	6/8/2016	6/7/2016	6/9/2016	6/21/2016	6/21/2016	6/19/2016	6/21/2016	6/21/2016	6/14/2016	6/19/2016	6/19/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
Sample Type	FD	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N
Chemical																				
SVOCs Continued																				
Indeno(1,2,3-cd)pyrene	< 0.14 U	< 0.14 U	< 0.020 U	13	< 0.019 UJ	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	< 0.020 U	< 0.019 U	< 0.019 U							
Isophorone	< 0.95 U	< 0.94 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.97 U	< 0.97 U	< 0.95 U							
Naphthalene	43 J	92 J	0.059	3.9	97 J-	0.039 J-	0.029	< 3.8 U	< 0.068 UJ	< 0.022 U	0.046 J+	0.027	< 0.019 U							
Nitrobenzene	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
n-Nitrosodimethylamine	< 0.48 UJ	< 0.47 UJ			< 0.93 UJ			< 0.94 UJ	< 1.1 UJ	< 1.1 UJ	< 0.49 UJ	< 0.97 UJ	< 0.95 UJ							
n-Nitroso-di-n-propylamine	< 0.48 U	< 0.47 U			< 2.3 U			< 2.4 U	< 2.8 UJ	< 2.7 U	< 0.49 U	< 2.4 U	< 2.4 U							
n-Nitrosodiphenylamine	< 0.48 U	< 0.47 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 0.49 U	< 0.97 U	< 0.95 U							
Pentachlorophenol	< 2.4 U	< 2.4 U			< 0.93 U			< 0.94 U	< 1.1 UJ	< 1.1 U	< 2.4 UJ	< 0.97 U	< 0.95 U							
Phenanthrene	24 J	38 J	0.038	28	13 J-	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.040 J+	< 0.019 U	0.026							
Phenol	< 0.48 UJ	< 0.47 UJ			< 0.93 UJ			< 0.94 UJ	< 1.1 UJ	< 1.1 UJ	< 0.49 UJ	< 0.97 UJ	< 0.95 UJ							
Pyrene	0.96 J	2.3 J	0.021	39	0.34 J	< 0.021 UJ	< 0.022 U	< 3.8 U	< 0.068 UJ	< 0.022 U	0.053 J+	< 0.019 U	0.023							
VOCs																				
1,1,1,2-Tetrachloroethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,1,1-Trichloroethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,1,2,2-Tetrachloroethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,1,2-Trichloroethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,1-Dichloroethane	< 1.0 U	< 1.0 U			< 1.0 U			< 1.0 U	R	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U							
1,1-Dichloroethene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,2,3-Trichloropropane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U							
1,2-Dibromo-3-chloropropane	< 2.0 U	< 2.0 U			< 2.0 UJ			< 2.0 U	R	< 2.0 UJ	< 2.0 U	< 2.0 U	< 2.0 U							
1,2-Dibromoethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,2-Dichloroethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
1,2-Dichloropropane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
2-Butanone	4.7 J	< 5.0 UJ			3.1 J			< 5.0 U	R	< 5.0 U	3.6 J	< 5.0 U	12							
2-Hexanone	< 1.0 UJ	< 1.0 UJ			< 1.0 U			< 1.0 U	R	< 1.0 U	< 1.0 U	< 1.0 U	1.4 J							
Acetone	< 0.60 UJ	< 0.60 UJ			< 0.60 UJ			< 0.60 U	18 J-	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Benzene	1.6 J	0.49 J			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Bromodichloromethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Bromoform	< 0.60 UJ	< 0.60 UJ			< 0.60 U			< 0.60 U	R	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U							
Carbon disulfide	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Carbon tetrachloride	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Chlorobenzene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Chloroethane	< 1.0 U	< 1.0 U			< 1.0 U			< 1.0 U	R	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U							
Chloroform	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Chloromethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
cis-1,2-Dichloroethene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
cis-1,3-Dichloropropene	< 0.60 UJ	< 0.60 UJ			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Dibromochloromethane	< 0.60 UJ	< 0.60 UJ			< 0.60 U			< 0.60 U	R	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U							
Dichlorodifluoromethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Ethylbenzene	18 J	2.6 J			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Methylene chloride	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Styrene	< 0.60 UJ	< 0.60 UJ			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Tetrachloroethene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Toluene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
trans-1,2-Dichloroethene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
trans-1,3-Dichloropropene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Trichloroethene	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Trichlorofluoromethane	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Vinyl Acetate	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Vinyl chloride	< 0.60 U	< 0.60 U			< 0.60 U			< 0.60 U	R	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U							
Xylenes (total)	17 J	1.9 J			< 1.8 U			< 1.8 U	R	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U							

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PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
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Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-H6	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-P113	CH-AOC-P113	CH-AOC-P113	CH-AOC-STB	CH-AOC-STB	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID	H6-SB03	MP-MW01	MP-SB01	MP-SB02	MP-SB03	MP-SB03	P113-SB01	P113-SB02	P113-SB03	STB-SB01	STB-SB03	WDS-SB01	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10
Sample Date	6/15/2016	6/22/2016	6/14/2016	6/19/2016	6/22/2016	6/22/2016	6/16/2016	6/16/2016	6/16/2016	6/10/2016	6/10/2016	6/16/2016	6/16/2016	6/16/2016	6/17/2016	6/19/2016	6/17/2016	6/17/2016	6/15/2016
Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical																			
Explosives																			
1,3,5-Trinitrobenzene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
1,3-Dinitrobenzene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
2,4,6-Trinitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
2,4-Dinitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
2,6-Dinitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
2-Amino-4,6-dinitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
2-Nitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
3-Nitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
4-Amino-2,6-Dinitro Toluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
4-Nitrotoluene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
Hexahydro-1,3,5-trinitro-1,3,5-triazine		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
Methyl-2,4,6-trinitrophenylnitramine		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
Nitrobenzene		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine		< 0.11 U		< 0.10 U	< 0.10 U	< 0.11 U													
Metals																			
Aluminum		51										29000	15000	6800 J+	150000	1200000	78000	1100000	52000
Antimony		1.0 J										1.4 J	0.61 J	0.40 J	0.94 J	0.66 J	1.1 J	1.9 J	8.6
Arsenic		3.2										8.3	5.4	0.90 J	9.4	23	11	34	5.6
Barium		45										190	110	57	630	6000	740	5700	350
Beryllium		< 0.50 U										1.1	0.79 J	0.34 J	5.6	28	4.6	43 J	2.7
Cadmium		< 0.50 U										1.5	< 0.50 U	< 0.50 U	2.8	5.7	1.1	8.8	0.36 J
Calcium (Ca)		12000										9200	10000	34000 J-	18000	110000	38000	47000	3500 J
Chromium		1.2 J										40	23	11	170	1100	180	1700	79
Cobalt		1.0 J										12	11	2.2 J	29	160	40	240	31
Copper		150										40	32	3.3 J	100	520	120	1100	54
Iron (Fe)		10000										25000	22000	11000	76000	380000	83000	970000	52000
Lead	52	52					34	37	220			56	12	5.0	69	270	190	480	22
Magnesium (Mg)		5700										11000	7900	7000	15000	120000	13000	270000	12000
Manganese (Mn)		750										450	510	280	590	4700	2100	13000	1300
Nickel		1.9 J										32	18	6.0 J	84	550	80	550	39 J
Potassium (K)		2100										4400	3200	2100	11000	78000	10000	180000	7200
Selenium		< 2.5 U										1.8 J	< 2.5 U	< 2.5 U	5.8	24	2.5 J	25	2.4 J
Silver		< 0.50 U										0.42 J	< 0.50 U	< 0.50 U	0.34 J	0.88 J	0.38 J	3.2	7.8
Sodium (Na)		25000										30000	28000	26000 J+	16000	23000	10000	12000	19000
Thallium		< 0.50 U										0.57 J	0.24 J	0.26 J	2.7	8.2	0.96 J	16	0.94 J
Vanadium		< 0.50 U										51	30	11	160	810	140	2700	85
Zinc		940										110	67	17 J	240	1300	150	2300	95
PCBs																			
Aroclor 1016	< 0.038 U	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U
Aroclor 1221	< 0.038 U	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U
Aroclor 1232	< 0.039 U	< 0.039 U				< 0.038 U						< 0.038 U	< 0.038 UJ	< 0.038 U	< 0.041 U	< 0.044 UJ	< 0.039 U	< 0.046 U	< 0.039 U
Aroclor 1242	< 0.038 U	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U
Aroclor 1248	< 0.038 U	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U
Aroclor 1254	2.0	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U
Aroclor 1260	< 0.038 U	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U
Aroclor 1262	< 0.094 U	< 0.096 U				< 0.093 U						< 0.093 U	< 0.093 UJ	< 0.093 U	< 0.10 U	< 0.11 UJ	< 0.094 U	< 0.11 U	< 0.095 U
Aroclor 1268	< 0.038 U	< 0.038 U				< 0.037 U						< 0.037 U	< 0.037 UJ	< 0.037 U	< 0.040 U	< 0.043 UJ	< 0.038 U	< 0.045 U	< 0.038 U

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-H6	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-P113	CH-AOC-P113	CH-AOC-P113	CH-AOC-STB	CH-AOC-STB	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID	H6-SB03	MP-MW01	MP-SB01	MP-SB02	MP-SB03	MP-SB03	P113-SB01	P113-SB02	P113-SB03	STB-SB01	STB-SB03	WDS-SB01	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10
Sample Date	6/15/2016	6/22/2016	6/14/2016	6/19/2016	6/22/2016	6/22/2016	6/16/2016	6/16/2016	6/16/2016	6/10/2016	6/10/2016	6/16/2016	6/16/2016	6/16/2016	6/17/2016	6/19/2016	6/17/2016	6/17/2016	6/15/2016
Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical																			
SVOCs																			
1,2,4-Trichlorobenzene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
1,2-Dichlorobenzene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
1,3-Dichlorobenzene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
1,4-Dichlorobenzene		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
1-Methylnaphthalene		< 0.019 U	220	0.027		< 0.019 U	< 0.019 U	< 0.019 U	0.050 J-	0.27 J+	0.14 J+	16 J-	44	< 0.019 U	0.080	0.10	< 0.019 U	< 0.39 U	< 0.019 U
2,4,5-Trichlorophenol		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 U	< 2.4 U	< 0.47 U	< 0.47 U	< 0.47 U	< 2.4 U	< 0.50 U	< 0.48 U	< 2.5 U	< 0.47 U
2,4,6-Trichlorophenol		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 U	< 0.47 U	< 0.47 U	< 0.47 U	< 0.94 U	< 0.50 U	< 0.48 U	< 0.98 U	< 0.47 U
2,4-Dichlorophenol		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 U	< 0.47 U	< 0.47 U	< 0.47 U	< 2.4 U	< 0.50 U	< 0.48 U	< 2.5 U	< 0.47 U
2,4-Dimethylphenol		< 2.4 U	< 2.4 U	< 0.96 U		< 2.4 U		< 0.94 U	< 0.95 U	< 2.4 U	< 2.4 U	< 0.93 U	< 0.93 U	< 0.93 U	< 2.4 U	< 1.0 U	< 0.95 U	< 2.5 U	< 0.94 U
2,4-Dinitrophenol		< 9.5 U	< 9.6 U	< 9.6 U		< 9.5 U		< 9.4 U	< 9.5 U	< 9.5 U	< 9.6 U	< 9.3 U	< 9.3 U	< 9.3 U	< 9.4 U	< 10 U	< 9.5 U	< 9.8 U	< 9.4 U
2,4-Dinitrotoluene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	0.59 J	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
2,6-Dinitrotoluene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
2-Chloronaphthalene		< 0.95 U	< 0.96 U	< 0.96 U		< 0.95 U		< 0.94 U	< 0.95 U	< 0.95 UJ	< 0.96 UJ	< 0.93 UJ	< 0.93 UJ	< 0.93 UJ	< 0.94 U	< 1.0 U	< 0.95 UJ	< 0.98 U	< 0.94 U
2-Chlorophenol		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 U	< 0.47 U	< 0.47 U	< 0.47 U	< 0.94 U	< 0.50 U	< 0.48 U	< 0.98 U	< 0.47 U
2-Methylnaphthalene		< 0.019 U	330	0.046		< 0.019 U	0.023	0.029	0.056 J-	0.50 J+	0.23 J+	5.5 J-	11	< 0.019 U	0.10	0.15	0.024	< 0.39 U	0.031
2-Methylphenol		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 U	< 0.47 U	< 0.47 U	< 0.47 U	< 0.94 U	< 0.50 U	< 0.48 U	< 0.98 U	< 0.47 U
2-Nitroaniline		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
2-Nitrophenol		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 U	< 0.47 U	< 0.47 U	< 0.47 U	< 2.4 U	< 0.50 U	< 0.48 U	< 2.5 U	< 0.47 U
3,3-Dichlorobenzidine		< 2.4 U	< 2.4 U	< 9.6 U		< 2.4 U		< 9.4 U	< 9.5 U	< 2.4 U	< 2.4 UJ	< 9.3 UJ	< 9.3 UJ	< 9.3 UJ	< 2.4 U	< 10 U	< 9.5 UJ	< 2.5 U	< 9.4 U
3,4-Methylphenol		< 4.8 U	< 4.8 U	< 0.96 U		< 4.8 U		< 0.94 U	< 0.95 U	< 4.8 U	< 4.8 U	< 0.93 U	< 0.93 U	< 0.93 U	< 4.7 U	< 1.0 U	< 0.95 U	< 4.9 U	< 0.94 U
3-Nitroaniline		< 0.95 U	< 0.96 U	< 0.96 U		< 0.95 U		< 0.94 U	< 0.95 U	< 0.95 U	< 0.96 UJ	< 0.93 UJ	< 0.93 UJ	< 0.93 UJ	< 0.94 U	< 1.0 U	< 0.95 UJ	< 0.98 U	< 0.94 U
4,6-Dinitro-2-methylphenol		< 0.95 U	< 0.96 U	< 2.4 U		< 0.95 U		< 2.4 U	< 2.4 U	< 0.95 U	< 0.96 U	< 2.3 U	< 2.3 U	< 2.3 U	< 0.94 U	< 2.5 U	< 2.4 U	< 0.98 U	< 2.4 U
4-Bromophenyl-phenylether		< 0.95 U	< 0.96 U	< 2.4 U		< 0.95 U		< 2.4 U	< 2.4 U	< 0.95 UJ	< 0.96 UJ	< 2.3 UJ	< 2.3 UJ	< 2.3 UJ	< 0.94 U	< 2.5 U	< 2.4 UJ	< 0.98 U	< 2.4 U
4-Chloro-3-methylphenol		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 U	< 2.4 U	< 0.47 U	< 0.47 U	< 0.47 U	< 2.4 U	< 0.50 U	< 0.48 U	< 2.5 U	< 0.47 U
4-Chloroaniline		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 U	< 0.47 U	< 0.47 U	< 0.47 U	< 0.94 U	< 0.50 U	< 0.48 U	< 0.98 U	< 0.47 U
4-Chlorophenyl-phenylether		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
4-Nitroaniline		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 U	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
4-Nitrophenol		< 2.4 U	< 2.4 UJ	< 9.6 UJ		< 2.4 U		< 9.4 UJ	< 9.5 UJ	< 2.4 UJ	< 2.4 U	< 9.3 UJ	< 9.3 UJ	< 9.3 UJ	< 2.4 UJ	< 10 UJ	< 9.5 UJ	< 2.5 UJ	< 9.4 UJ
Acenaphthene		< 0.019 U	26	0.048		< 0.019 U	< 0.019 U	< 0.019 U	0.032 J-	0.024	0.085 J+	20 J-	45	2.9	0.24	0.033	< 0.019 U	< 0.39 U	< 0.019 U
Acenaphthylene		< 0.019 U	0.65	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.042 J-	< 0.019 U	0.054 J+	0.72 J-	1.4	0.026	< 0.019 U	< 0.020 U	< 0.019 U	< 0.39 U	< 0.019 U
Anthracene		< 0.019 U	0.89	0.021		< 0.019 U	< 0.019 U	< 0.019 U	0.039 J-	< 0.019 U	0.18 J+	0.78 J-	8.7	0.066	0.20	< 0.020 U	< 0.019 U	0.43	< 0.019 U
Benzo(a)anthracene		< 0.019 U	0.12	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.28 J-	< 0.019 U	0.10 J+	0.30 J-	0.18	0.019	0.20 J+	0.059 J+	< 0.019 U	0.48 J+	< 0.019 U
Benzo(a)pyrene		< 0.019 U	0.031	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.22 J-	< 0.019 U	0.028 J+	0.073 J-	0.048	< 0.019 U	0.13	0.054	< 0.019 U	< 0.39 U	< 0.019 U
Benzo(b)fluoranthene		< 0.019 U	0.056	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.44 J-	< 0.019 U	0.038 J+	0.16 J-	0.10	0.030	0.21	0.11	< 0.019 U	0.59	< 0.019 U
Benzo(g,h,i)perylene		< 0.019 U	0.036	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.13 J-	< 0.019 U	< 0.021 U	0.073 J-	0.025	< 0.019 U	0.034	0.023	< 0.019 U	< 0.39 U	< 0.019 U
Benzo(k)fluoranthene		< 0.019 UJ	< 0.019 U	< 0.019 U		< 0.019 UJ	< 0.019 U	< 0.019 U	0.12 J-	< 0.019 U	0.024 J+	0.051 J-	0.034	< 0.019 U	0.095	0.042	< 0.019 U	< 0.39 U	< 0.019 U
Benzoic acid		< 2.4 UJ	33 J	< 9.6 UJ		< 2.4 UJ		< 9.4 UJ	12 J	< 2.4 U	< 2.4 U	9.6 J	15 J	11 J	19 J	9.5 J	< 9.5 UJ	< 2.5 UJ	< 9.4 UJ
Benzyl Alcohol		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 U	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
Bis(2-chloro-1-methylethyl) ether		< 2.4 U	< 2.4 UJ	< 0.48 UJ		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 UJ	< 0.48 UJ	< 2.5 U	< 0.47 U
Bis(2-chloroethoxy)methane		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
Bis(2-chloroethyl)ether		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
Bis(2-ethylhexyl)phthalate		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Butyl benzyl phthalate		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 U	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
CARBAZOLE		< 0.95 U	1.8 J	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	7.6 J-	4.4 J	< 0.47 UJ	2.1 J	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Chrysene		< 0.019 U	0.095	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.20 J-	< 0.019 U	0.032 J+	0.14 J-	0.082	< 0.019 U	0.17	0.068	< 0.019 U	0.48	< 0.019 U
Dibenz(a,h)anthracene		< 0.019 U	< 0.019 U	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.023 J-	< 0.019 U	< 0.021 U	< 0.019 UJ	< 0.019 U	< 0.019 U	< 0.019 U	< 0.020 U	< 0.019 U	< 0.39 U	< 0.019 U
Dibenzofuran		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	13 J-	9.4 J-	0.31 J	1.6 J	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Diethyl phthalate		< 0.95 U	5.0	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Dimethyl phthalate		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Di-n-butyl phthalate		< 0.95 U	1.1 J	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Di-n-octyl phthalate		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 U	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
Fluoranthene		< 0.019 U	0.28	0.051		< 0.019 U	< 0.019 U	< 0.019 U	0.42 J-	< 0.019 U	0.13 J+	2.3	4.2	0.12	0.55	0.17	0.019	1.1	< 0.019 U
Fluorene		< 0.019 U	16	0.043		< 0.019 U	< 0.019 U	< 0.019 U	0.045 J-	0.020 J+	0.13 J+	9.8 J-	21	0.059	0.26	< 0.020 U	< 0.019 U	< 0.39 U	< 0.019 U
Hexachlorobenzene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Hexachlorobutadiene		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Hexachloroethane		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-H6	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-MP	CH-AOC-P113	CH-AOC-P113	CH-AOC-P113	CH-AOC-STB	CH-AOC-STB	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID	H6-SB03	MP-MW01	MP-SB01	MP-SB02	MP-SB03	MP-SB03	P113-SB01	P113-SB02	P113-SB03	STB-SB01	STB-SB03	WDS-SB01	WDS-SB02	WDS-SB03	WDS-SB06	WDS-SB07	WDS-SB08	WDS-SB09	WDS-SB10
Sample Date	6/15/2016	6/22/2016	6/14/2016	6/19/2016	6/22/2016	6/22/2016	6/16/2016	6/16/2016	6/16/2016	6/10/2016	6/10/2016	6/16/2016	6/16/2016	6/16/2016	6/17/2016	6/19/2016	6/17/2016	6/17/2016	6/15/2016
Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Chemical																			
SVOCs Continued																			
Indeno(1,2,3-cd)pyrene		< 0.019 U	< 0.019 U	< 0.019 U		< 0.019 U	< 0.019 U	< 0.019 U	0.097 J-	< 0.019 U	< 0.021 U	0.061 J-	0.022	< 0.019 U	0.034	0.023	< 0.019 U	< 0.39 U	< 0.019 U
Isophorone		< 0.95 U	< 0.96 U	< 0.96 U		< 0.95 U		< 0.94 U	< 0.95 U	< 0.95 UJ	< 0.96 UJ	< 0.93 UJ	< 0.93 UJ	< 0.93 UJ	< 0.94 U	< 1.0 U	< 0.95 UJ	< 0.98 U	< 0.94 U
Naphthalene		< 0.019 U	210	0.040		< 0.019 U	0.027	0.019	0.15 J-	0.19 J+	0.14 J+	92 J-	200	0.045	0.35	0.12	0.022	< 0.39 U	0.023
Nitrobenzene		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
n-Nitrosodimethylamine		< 0.95 UJ	< 0.96 UJ	< 0.48 UJ		< 0.95 UJ		< 0.47 UJ	< 0.48 UJ	< 0.95 UJ	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 UJ	< 0.50 UJ	< 0.48 UJ	< 0.98 UJ	< 0.47 UJ
n-Nitroso-di-n-propylamine		< 2.4 U	< 2.4 U	< 0.48 U		< 2.4 U		< 0.47 U	< 0.48 U	< 2.4 UJ	< 2.4 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 2.4 U	< 0.50 U	< 0.48 UJ	< 2.5 U	< 0.47 U
n-Nitrosodiphenylamine		< 0.95 U	< 0.96 U	< 0.48 U		< 0.95 U		< 0.47 U	< 0.48 U	< 0.95 U	< 0.96 UJ	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 U	< 0.50 U	< 0.48 UJ	< 0.98 U	< 0.47 U
Pentachlorophenol		< 0.95 U	< 0.96 U	< 2.4 UJ		< 0.95 U		< 2.4 U	< 2.4 U	< 0.95 U	< 0.96 U	< 2.3 U	< 2.3 U	< 2.3 U	< 0.94 U	< 2.5 UJ	< 2.4 U	< 0.98 U	< 2.4 U
Phenanthrene		< 0.019 U	60	0.16		< 0.019 U	< 0.019 U	< 0.019 U	0.31 J-	0.026 J+	0.19 J+	7.8 J-	11	0.046	0.82	0.10	0.031	0.62	0.030
Phenol		< 0.95 UJ	< 0.96 UJ	< 0.48 UJ		< 0.95 UJ		< 0.47 UJ	< 0.48 UJ	< 0.95 UJ	< 0.96 U	< 0.47 UJ	< 0.47 UJ	< 0.47 UJ	< 0.94 UJ	< 0.50 UJ	< 0.48 UJ	< 0.98 UJ	< 0.47 UJ
Pyrene		< 0.019 U	0.68	0.045		< 0.019 U	< 0.019 U	< 0.019 U	0.56 J-	< 0.019 U	0.13 J+	1.8	2.4	0.075	0.41	0.15	0.021	0.91	< 0.019 U
VOCs																			
1,1,1,2-Tetrachloroethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,1,1-Trichloroethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,1,2,2-Tetrachloroethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,1,2-Trichloroethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,1-Dichloroethane		< 1.0 U	< 1.0 U	< 1.0 U		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,2,3-Trichloropropane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dibromo-3-chloropropane		< 2.0 U	< 2.0 U	< 2.0 U		< 2.0 U	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 U	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 U	< 10 UJ	< 2.0 UJ	< 2.0 U	< 2.0 UJ
1,2-Dibromoethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dichloroethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dichloropropane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
2-Butanone		< 5.0 U	19	< 5.0 U		< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	19	5.3 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 25 UJ	< 5.0 U	33	< 5.0 U
2-Hexanone		< 1.0 U	2.7	< 1.0 U		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U
Acetone		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	26	< 0.60 U
Benzene		< 0.60 U	0.47 J	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Bromodichloromethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Bromoform		< 0.60 UJ	< 0.60 U	< 0.60 U		< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 3.0 UJ	< 0.60 UJ	< 0.60 U	< 0.60 UJ
Carbon disulfide		0.75 J	0.56 J	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	1.0	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	1.3	< 3.0 UJ	< 0.60 U	1.1	< 0.60 U
Carbon tetrachloride		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Chlorobenzene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 3.0 UJ	< 0.60 UJ	< 0.60 U	< 0.60 UJ
Chloroethane		< 1.0 U	< 1.0 U	< 1.0 U		< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 5.0 UJ	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Chloromethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
cis-1,2-Dichloroethene		< 0.60 U	1.4	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
cis-1,3-Dichloropropene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Dibromochloromethane		< 0.60 UJ	< 0.60 U	< 0.60 U		< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Dichlorodifluoromethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Ethylbenzene		< 0.60 U	8.5	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	1.4	1.5	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Methylene chloride		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Styrene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Tetrachloroethene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Toluene		< 0.60 U	2.5	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	0.56 J	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
trans-1,2-Dichloroethene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
trans-1,3-Dichloropropene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Trichloroethene		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Trichlorofluoromethane		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Vinyl Acetate		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Vinyl chloride		< 0.60 U	< 0.60 U	< 0.60 U		< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 3.0 UJ	< 0.60 U	< 0.60 U	< 0.60 U
Xylenes (total)		< 1.8 U	45	< 1.8 U		< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	2.6 J	2.7 J	< 1.8 U	< 1.8 U	< 9.0 UJ	< 1.8 U	< 1.8 U	< 1.8 U

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID	WDS-SB11	WDS-SB12	WDS-SB13	WDS-SB15	WDS-SB18	WDS-SB19	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB22	WDS-SB23	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB26	WDS-SB27
Sample Date	6/17/2016	6/17/2016	6/17/2016	6/17/2016	6/20/2016	6/20/2016	6/12/2016	6/12/2016	6/8/2016	6/8/2016	6/9/2016	6/9/2016	6/9/2016	6/8/2016	6/8/2016	6/8/2016	6/8/2016
Sample Type	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	FD	N	N
Chemical																	
Explosives																	
1,3,5-Trinitrobenzene																	
1,3-Dinitrobenzene																	
2,4,6-Trinitrotoluene																	
2,4-Dinitrotoluene																	
2,6-Dinitrotoluene																	
2-Amino-4,6-dinitrotoluene																	
2-Nitrotoluene																	
3-Nitrotoluene																	
4-Amino-2,6-Dinitro Toluene																	
4-Nitrotoluene																	
Hexahydro-1,3,5-trinitro-1,3,5-triazine																	
Methyl-2,4,6-trinitrophenylnitramine																	
Nitrobenzene																	
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine																	
Metals																	
Aluminum	100000	30000	4700	32000	1700	26000	59000	1700 J-	15000 J	280000 J	100000 J	210000 J	680000	22000	9700	9800	20000
Antimony	1.0 J	0.34 J	< 0.75 U	0.30 J	0.35 J	0.48 J	< 0.75 U	1.3 J	< 0.75 UJ	< 0.75 UJ	< 0.75 UJ	< 0.75 UJ	< 0.75 U	< 0.75 U	< 0.75 U	< 0.75 U	< 0.75 U
Arsenic	6.2	10	< 1.0 U	3.3	< 1.0 U	6.7	8.2	< 1.0 U	0.76 J	16 J	140 J	95 J	310	5.2	2.5 J	1.7 J	4.2
Barium	250	140	65	250	67	290	390	19 J	49 J	1600 J	630 J	1200 J	10000	120	79	75	170
Beryllium	2.1	1.4	0.37 J	1.5	< 0.50 U	1.2	< 10 U	< 0.50 U	< 10 UJ	16 J	< 10 UJ	8.2 J	87	< 10 U	< 10 U	< 10 U	< 10 U
Cadmium	0.48 J	0.32 J	< 0.50 U	< 0.50 U	< 0.50 U	0.40 J	1.2	< 0.50 U	< 0.50 UJ	4.8 J	1.6 J	3.5 J	15	0.46 J	< 0.50 U	< 0.50 U	0.43 J
Calcium (Ca)	8500	6800	6900	4000	13000	21000	28000	2000	12000 J	52000 J	27000 J	51000 J	180000	36000	8500	8600	29000
Chromium	83	50	7.3 J	49	4.2 J	43	67	2.1 J	11 J	340 J	190 J	480 J	1600	27	14	13	30
Cobalt	14	18	2.3 J	9.5	4.2 J	20	23	1.5 J	3.6 J	140 J	40 J	77 J	560	16	7.5	7.1	12
Copper	59	26	4.5 J	27	4.6 J	34	46	0.82 J	4.8 J	220 J	230 J	510 J	1300	15	6.3	5.8	16
Iron (Fe)	23000	40000	4600	28000	3200	38000	46000	1900 J-	4600 J	92000 J	140000 J	320000 J	930000	17000	13000	11000	16000
Lead	34	21	9.3	15	1.3	25	20	0.97 J	4.4 J	120 J	44 J	69 J	530	13	4.6	4.1	13
Magnesium (Mg)	9100	7400	6000	9100	6800	19000	16000	1800	4400 J	15000 J	25000 J	43000 J	260000	8300	8700	8700	15000
Manganese (Mn)	650	1200	96	460	780	1100	2000	240	180 J	6800 J	1100 J	2500 J	8900	720	670	700	430
Nickel	34	27	4.6 J	23	11	35	47	1.9 J	5.0 J	100 J	100 J	190 J	1100	21	8.3 J	7.4 J	16
Potassium (K)	4700	5300	2200	6200	3500	8900	11000	2400 J-	2500 J	13000 J	13000 J	27000 J	130000	3500	1800	1800	3600
Selenium	3.3 J	< 2.5 U	1.5 J	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U	1.5 J	< 2.5 UJ	7.0 J	5.8	5.5	< 50 U	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 U
Silver	0.28 J	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	0.78 J	0.60 J	< 0.50 UJ	0.62 J	0.76 J	1.1 J	5.0	0.28 J	< 0.50 U	< 0.50 U	0.24 J
Sodium (Na)	31000	13000	55000	19000	18000	25000	23000	14000 J-	16000	20000	15000	17000	34000	30000	32000	36000	36000
Thallium	0.52 J	0.38 J	< 0.50 U	0.48 J	< 0.50 U	0.52 J	0.53 J	< 0.50 U	< 0.50 UJ	0.90 J	1.0 J	1.8 J	17 J	0.20 J	< 0.50 U	< 0.50 U	0.86 J
Vanadium	86	46	9.8	46	3.6 J	58	100	2.7 J	11 J	280 J	190 J	470 J	2700	40	19	17	41
Zinc	130	69	11 J	68	160	100	120	< 2.5 U	11 J	270 J	220 J	460 J	5400	60	23 J	22 J	58
PCBs																	
Aroclor 1016	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	
Aroclor 1221	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	
Aroclor 1232	< 0.039 U	< 0.040 U	< 0.039 U	< 0.040 U	< 0.041 U	< 0.044 U	< 0.046 U	< 0.039 U	< 0.038 U	< 0.041 U	< 0.039 U	< 0.039 U	< 0.039 U	< 0.040 U	< 0.039 U	< 0.038 U	
Aroclor 1242	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	
Aroclor 1248	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	
Aroclor 1254	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	
Aroclor 1260	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	
Aroclor 1262	< 0.094 U	< 0.097 U	< 0.094 U	< 0.098 U	< 0.10 U	< 0.11 U	< 0.11 U	< 0.094 U	< 0.093 U	< 0.10 U	< 0.094 U	< 0.094 U	< 0.095 U	< 0.097 U	< 0.095 U	< 0.093 U	
Aroclor 1268	< 0.038 U	< 0.039 U	< 0.038 U	< 0.039 U	< 0.040 U	< 0.043 U	< 0.045 U	< 0.038 U	< 0.037 U	< 0.040 U	< 0.038 U	< 0.038 U	< 0.038 U	< 0.039 U	< 0.038 U	< 0.037 U	

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID	WDS-SB11	WDS-SB12	WDS-SB13	WDS-SB15	WDS-SB18	WDS-SB19	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB22	WDS-SB23	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB26	WDS-SB27
Sample Date	6/17/2016	6/17/2016	6/17/2016	6/17/2016	6/20/2016	6/20/2016	6/12/2016	6/12/2016	6/8/2016	6/8/2016	6/9/2016	6/9/2016	6/9/2016	6/8/2016	6/8/2016	6/8/2016	6/8/2016
Sample Type	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	FD	N	N
Chemical																	
SVOCs																	
1,2,4-Trichlorobenzene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
1,2-Dichlorobenzene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
1,3-Dichlorobenzene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
1,4-Dichlorobenzene	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
1-Methylnaphthalene	< 0.019 U	< 0.020 U	0.032	< 0.020 U	0.047	0.057 J-	0.036 J+	0.056 J+	< 0.020 UJ	< 0.020 UJ	0.030 J	0.041 J	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
2,4,5-Trichlorophenol	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 U	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 U	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
2,4,6-Trichlorophenol	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2,4-Dichlorophenol	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 U	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 U	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
2,4-Dimethylphenol	< 2.4 U	< 0.98 U	< 0.95 U	< 0.99 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 U	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 U	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
2,4-Dinitrophenol	< 9.5 U	< 9.8 U	< 9.5 U	< 9.9 U	< 10 U	< 10 U	< 13 U	< 9.3 U	< 10 U	< 9.3 U	< 9.4 U	< 9.5 U	< 9.3 U	< 10 U	< 9.4 U	< 9.3 U	< 25 U
2,4-Dinitrotoluene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2,6-Dinitrotoluene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2-Chloronaphthalene	< 0.95 U	< 0.98 U	< 0.95 U	< 0.99 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2-Chlorophenol	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2-Methylnaphthalene	< 0.019 U	0.023	0.035	< 0.020 U	0.11	0.081 J-	0.062 J+	0.087 J+	< 0.020 UJ	< 0.020 UJ	0.043	0.057	0.026 J-	< 0.019 U	< 0.019 UJ	< 0.019 UJ	0.020
2-Methylphenol	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2-Nitroaniline	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
2-Nitrophenol	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 U	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 U	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
3,3-Dichlorobenzidine	< 2.4 U	< 9.8 U	< 9.5 U	< 9.9 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
3,4-Methylphenol	< 4.8 U	< 0.98 U	< 0.95 U	< 0.99 U	< 5.1 U	< 5.2 U	< 6.3 U	< 4.7 U	< 5.0 U	< 4.7 U	< 4.7 U	< 4.8 U	< 4.7 U	< 5.0 U	< 4.7 U	< 4.7 U	< 12 U
3-Nitroaniline	< 0.95 U	< 0.98 U	< 0.95 U	< 0.99 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
4,6-Dinitro-2-methylphenol	< 0.95 U	< 2.5 U	< 2.4 U	< 2.5 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
4-Bromophenyl-phenylether	< 0.95 U	< 2.5 U	< 2.4 U	< 2.5 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
4-Chloro-3-methylphenol	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 U	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 U	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
4-Chloroaniline	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
4-Chlorophenyl-phenylether	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
4-Nitroaniline	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
4-Nitrophenol	< 2.4 UJ	< 9.8 UJ	< 9.5 UJ	< 9.9 UJ	< 2.5 U	< 2.6 U	< 3.2 UJ	< 2.3 U	< 2.5 UJ	< 2.3 UJ	< 2.4 UJ	< 2.4 UJ	< 2.3 UJ	< 2.5 UJ	< 2.4 UJ	< 2.3 UJ	< 6.2 U
Acenaphthene	< 0.019 U	< 0.020 U	0.057	< 0.020 U	< 0.020 U	0.093 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	0.056 J-	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Acenaphthylene	< 0.019 U	< 0.020 U	0.022	< 0.020 U	< 0.020 U	< 0.019 UJ	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Anthracene	< 0.019 U	< 0.020 U	0.14	< 0.020 U	< 0.020 U	0.058 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Benzo(a)anthracene	< 0.019 U	< 0.020 U	0.95	< 0.020 U	< 0.020 U	0.11 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Benzo(a)pyrene	< 0.019 U	< 0.020 U	0.69	< 0.020 U	< 0.020 U	0.067 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Benzo(b)fluoranthene	< 0.019 U	0.023	1.2	< 0.020 U	< 0.020 U	0.10 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	0.025 J	< 0.019 UJ	< 0.020 U
Benzo(g,h,i)perylene	< 0.019 U	< 0.020 U	0.37	< 0.020 U	< 0.020 U	0.051 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Benzo(k)fluoranthene	< 0.019 U	< 0.020 U	0.30	< 0.020 U	< 0.020 UJ	0.034 J	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Benzoic acid	8.8 J	< 9.8 UJ	< 9.5 UJ	< 9.9 UJ	< 2.5 UJ	< 2.6 UJ	< 3.2 UJ	< 2.3 U	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 U	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
Benzyl Alcohol	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
Bis(2-chloro-1-methylethyl) ether	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 UJ	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
Bis(2-chloroethoxy)methane	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
Bis(2-chloroethyl)ether	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
Bis(2-ethylhexyl)phthalate	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Butyl benzyl phthalate	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
CARBAZOLE	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Chrysene	< 0.019 U	< 0.020 U	0.61	< 0.020 U	< 0.020 U	0.062 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	0.020 J	< 0.019 UJ	< 0.020 U
Dibenz(a,h)anthracene	< 0.019 U	< 0.020 U	0.13	< 0.020 U	< 0.020 U	< 0.019 UJ	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Dibenzofuran	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Diethyl phthalate	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Dimethyl phthalate	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Di-n-butyl phthalate	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Di-n-octyl phthalate	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
Fluoranthene	< 0.019 U	0.024	1.9	< 0.020 U	< 0.020 U	0.19 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	0.043 J	< 0.019 UJ	< 0.020 U
Fluorene	< 0.019 U	< 0.020 U	0.071	< 0.020 U	0.030	0.069 J-	< 0.023 U	0.021 J+	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Hexachlorobenzene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Hexachlorobutadiene	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Hexachloroethane	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 3
Grab Groundwater Sample Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS	CH-AOC-WDS
Location ID	WDS-SB11	WDS-SB12	WDS-SB13	WDS-SB15	WDS-SB18	WDS-SB19	WDS-SB20	WDS-SB21	WDS-SB22	WDS-SB22	WDS-SB23	WDS-SB23	WDS-SB24	WDS-SB25	WDS-SB26	WDS-SB26	WDS-SB27
Sample Date	6/17/2016	6/17/2016	6/17/2016	6/17/2016	6/20/2016	6/20/2016	6/12/2016	6/12/2016	6/8/2016	6/8/2016	6/9/2016	6/9/2016	6/9/2016	6/8/2016	6/8/2016	6/8/2016	6/8/2016
Sample Type	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	FD	N	N
Chemical																	
SVOCs Continued																	
Indeno(1,2,3-cd)pyrene	< 0.019 U	< 0.020 U	0.37	< 0.020 U	< 0.020 U	0.043 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	< 0.019 UJ	< 0.019 UJ	< 0.020 U
Isophorone	< 0.95 U	< 0.98 U	< 0.95 U	< 0.99 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Naphthalene	< 0.019 U	< 0.020 U	0.052	< 0.020 U	0.040	0.29 J-	0.055 J+	0.080 J+	< 0.020 UJ	< 0.020 UJ	0.078 J	0.11 J	0.069 J-	< 0.019 U	0.021 J	< 0.019 UJ	0.040
Nitrobenzene	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
n-Nitrosodimethylamine	< 0.95 UJ	< 0.49 UJ	< 0.48 UJ	< 0.50 UJ	< 1.0 UJ	< 1.0 UJ	< 1.3 UJ	< 0.93 UJ	< 1.0 UJ	< 0.93 UJ	< 0.94 UJ	< 0.95 UJ	< 0.93 UJ	< 1.0 UJ	< 0.94 UJ	< 0.93 UJ	< 2.5 UJ
n-Nitroso-di-n-propylamine	< 2.4 U	< 0.49 U	< 0.48 U	< 0.50 U	< 2.5 U	< 2.6 U	< 3.2 U	< 2.3 UJ	< 2.5 U	< 2.3 U	< 2.4 U	< 2.4 U	< 2.3 UJ	< 2.5 U	< 2.4 U	< 2.3 U	< 6.2 U
n-Nitrosodiphenylamine	< 0.95 U	< 0.49 U	< 0.48 U	< 0.50 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 UJ	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 UJ	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Pentachlorophenol	< 0.95 U	< 2.5 U	< 2.4 U	< 2.5 U	< 1.0 U	< 1.0 U	< 1.3 U	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Phenanthrene	< 0.019 U	0.028	0.76	< 0.020 U	0.044	0.33 J-	< 0.023 U	0.036 J+	< 0.020 UJ	< 0.020 UJ	0.024	0.028	0.025 J-	< 0.019 U	0.021 J	< 0.019 UJ	< 0.020 U
Phenol	< 0.95 UJ	< 0.49 UJ	< 0.48 UJ	< 0.50 UJ	< 1.0 UJ	< 1.0 UJ	< 1.3 UJ	< 0.93 U	< 1.0 U	< 0.93 U	< 0.94 U	< 0.95 U	< 0.93 U	< 1.0 U	< 0.94 U	< 0.93 U	< 2.5 U
Pyrene	< 0.019 U	0.021	1.4	< 0.020 U	< 0.020 U	0.18 J-	< 0.023 U	< 0.019 U	< 0.020 UJ	< 0.020 UJ	< 0.019 U	< 0.019 U	< 0.019 UJ	< 0.019 U	0.032 J	< 0.019 UJ	< 0.020 U
VOCs																	
1,1,1,2-Tetrachloroethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,1,1-Trichloroethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,1,2,2-Tetrachloroethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,1,2-Trichloroethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,1-Dichloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
1,1-Dichloroethene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,2,3-Trichloropropane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dibromo-3-chloropropane	< 2.0 U	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 UJ	< 2.0 U	< 2.0 UJ	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
1,2-Dibromoethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dichloroethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
1,2-Dichloropropane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
2-Butanone	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	6.6 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	3.3 J	< 5.0 U	< 5.0 U	< 5.0 U	5.6 J
2-Hexanone	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Acetone	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 U
Benzene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Bromodichloromethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Bromoform	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Carbon disulfide	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Carbon tetrachloride	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Chlorobenzene	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Chloroethane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Chloroform	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	1.8	1.4	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Chloromethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
cis-1,2-Dichloroethene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
cis-1,3-Dichloropropene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Dibromochloromethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 UJ	< 0.60 UJ	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Dichlorodifluoromethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Ethylbenzene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Methylene chloride	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	2.2 J	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Styrene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Tetrachloroethene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Toluene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
trans-1,2-Dichloroethene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
trans-1,3-Dichloropropene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Trichloroethene	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Trichlorofluoromethane	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Vinyl Acetate	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Vinyl chloride	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U	< 0.60 U
Xylenes (total)	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U	< 1.8 U

Notes:
All units are in micrograms per liter (ug/l)
< - Result not detected above laboratory reporting limit.
FD - Field duplicate.
J - Estimated value.
J- - The chemical was positively identified; however, the associated numerical value is a low estimated concentration.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 4
Groundwater Sample Results (Phase II)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	CH-MW016	CH-MW016	CH-MW018	CH-MW019	CH-MW020	CH-MW021
Sample Date	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/14/2016
Sample Type	FD	N	N	N	N	N
Chemical						
Metals - Dissolved						
Aluminum	< 50.0 U	< 50.0 U	90.7 J	36800	< 50.0 U	868
Antimony	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Arsenic	< 2.0 U	< 2.0 U	< 2.0 U	7.9	< 2.0 U	0.98 J
Barium	53.0	49.9	17.8	320	8.0	72.5
Beryllium	< 0.25 U	< 0.25 U	< 0.25 U	1.5	< 0.25 U	< 0.25 U
Cadmium	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
Calcium (Ca)	27300	26800	6220	8450	16200	78800
Chromium	< 2.0 U	< 2.0 U	1.1 J	58.0	< 2.0 U	1.6 J
Chromium(III), Insoluble Salts	< 2.0 U	< 2.0 U	1.1 J	58	< 2.0 U	1.6 J
Chromium(VI)	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	0.016 J	0.026 J
Cobalt	2.3	2.3	1.3	18.6	< 0.50 U	1.4
Copper	< 1.0 UJ	0.67 J	< 1.0 U	38.5	< 1.0 U	2.4 J
Iron (Fe)	39.4 J	38.8 J	13600	42500	< 100 U	1070
Lead	< 0.25 U	< 0.25 U	< 0.25 U	15.1	< 0.25 U	0.43 J
Magnesium (Mg)	22100	21200	5900	16900	1740	15100
Manganese (Mn)	910	877	1340	849	200	775
Mercury	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U
Nickel	1.1 J	1.2 J	< 2.0 U	38.6	< 2.0 U	2.1 J
Potassium (K)	3360	3120	1370	13900	1930	4060
Selenium	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Silver	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U
Sodium (Na)	42400	40600	18000	20100	10800	37500
Thallium	< 0.25 U	< 0.25 U	< 0.25 U	0.62 J	< 0.25 U	< 0.25 U
Vanadium	0.40 J	0.28 J	0.75 J	85.9	1.1	4.8
Zinc	< 7.5 UJ	4.0 J	4.1 J	96.9	< 7.5 U	4.0 J
Metals - Total						
Aluminum	78.6 J	73.4 J	519	91600	101 J	12200
Antimony	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Arsenic	< 2.0 U	< 2.0 U	< 2.0 U	20.4	< 2.0 UJ	3.3 J
Barium	50.4	49.2	17.6	818	8.5 J	152
Beryllium	< 0.25 U	< 0.25 U	< 0.25 U	4.0	< 0.25 U	0.55 J
Cadmium	< 0.50 U	< 0.50 U	< 0.50 U	0.20 J	< 0.50 U	< 0.50 U
Calcium (Ca)	26600	27400	6510	11600	17700	87500
Chromium	< 2.0 U	< 2.0 U	1.4 J	31.5	< 2.0 U	18.0
Chromium(III), Insoluble Salts	< 2.0 U	< 2.0 U	1.4 J	31	< 2.0 U	18
Chromium(VI)	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 U	< 0.050 UJ	0.018 J
Cobalt	2.5	2.4	1.4	53.6	< 0.50 U	6.7
Copper	< 1.0 U	< 1.0 U	0.92 J	111	< 1.0 U	14.3
Iron (Fe)	142 J	104 J	14900	110000	94.4 J	14000
Lead	< 0.25 U	< 0.25 U	0.45 J	38.5	0.18 J	6.0
Magnesium (Mg)	21000	21000	6210	39300	1770	20700
Manganese (Mn)	861	879	1410	2120	224 J+	1090
Mercury	< 0.10 U	< 0.10 U	< 0.10 U	0.11 J	< 0.10 U	< 0.10 U
Nickel	1.2 J	1.1 J	< 2.0 U	115	< 2.0 U	13.2
Potassium (K)	3210	3270	1480	31200	2150	7860
Selenium	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Silver	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U	< 0.25 U
Sodium (Na)	43300	43400	19400	21700	11300	38700
Thallium	< 0.25 U	< 0.25 U	< 0.25 U	1.7	< 0.25 U	0.23 J
Vanadium	0.64 J	0.41 J	1.6	232	1.2 J	31.4
Zinc	3.8 J	4.8 J	7.2 J	282	< 7.5 UJ	38.3

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Groundwater Sample Results (Phase II)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	CH-MW016	CH-MW016	CH-MW018	CH-MW019	CH-MW020	CH-MW021
Sample Date	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/14/2016
Sample Type	FD	N	N	N	N	N
Chemical						
SVOCs						
1,2,4-Trichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
1,2-Dichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
1,3-Dichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
1,4-Dichlorobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
1-Methylnaphthalene	3.7	3.4	0.026 J	0.011 J	5.4 J+	7.9
2,4,5-Trichlorophenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2,4,6-Trichlorophenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2,4-Dichlorophenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2,4-Dimethylphenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2,4-Dinitrophenol	< 30 U	< 30 U	< 30 U	< 30 U	< 32 U	< 30 U
2,4-Dinitrotoluene	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
2,6-Dinitrotoluene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2-Chloronaphthalene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2-Chlorophenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2-Methylnaphthalene	6.4	5.5	< 0.050 U	< 0.050 U	1.4 J+	< 0.040 U
2-Methylphenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2-Nitroaniline	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
2-Nitrophenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
3,3-Dichlorobenzidine	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
3,4-Methylphenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
3-Nitroaniline	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
4,6-Dinitro-2-methylphenol	< 15 U	< 15 U	< 15 U	< 15 U	< 16 U	< 15 U
4-Bromophenyl-phenylether	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
4-Chloro-3-methylphenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
4-Chloroaniline	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
4-Chlorophenyl-phenylether	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
4-Nitroaniline	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
4-Nitrophenol	< 30 U	< 30 U	< 30 U	< 30 U	< 32 U	< 30 U
Acenaphthene	1.1	0.95	0.023 J	< 0.040 U	0.48	1.5
Acenaphthylene	0.15	0.14	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Acetophenone	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Anthracene	0.042 J	0.060 J	< 0.040 U	< 0.040 U	0.14	0.59
Atrazine	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Benzaldehyde	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Benzo(a)anthracene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Benzo(a)pyrene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Benzo(b)fluoranthene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Benzo(g,h,i)perylene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Benzo(k)fluoranthene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Benzoic acid	< 15 UJ	8.2 J	< 15 U	< 15 U	< 16 U	< 15 U
Benzyl Alcohol	< 15 U	< 15 U	< 15 U	< 15 U	< 16 U	< 15 U
Biphenyl, 1,1'-	12	10	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Bis(2-chloro-1-methylethyl) ether	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Bis(2-chloroethoxy)methane	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	0.59 J
Bis(2-chloroethyl)ether	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Bis(2-ethylhexyl)phthalate	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Butyl benzyl phthalate	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Caprolactam	< 15 U	< 15 U	< 15 U	< 15 U	< 16 U	< 15 U
CARBAZOLE	3.4	3.0	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Chrysene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Dibenzofuran	2.6	2.4	< 1.0 U	< 1.0 U	0.57 J	2.9

Notes:
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N - Normal sample.
SVOC - Semivolatile Organic Compound.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.
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Groundwater Sample Results (Phase II)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203	CH-AOC-203
Location ID	CH-MW016	CH-MW016	CH-MW018	CH-MW019	CH-MW020	CH-MW021
Sample Date	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/14/2016
Sample Type	FD	N	N	N	N	N
Chemical						
SVOCs Continued						
Diethyl phthalate	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Dimethyl phthalate	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Di-n-butyl phthalate	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Dibenz(a,h)anthracene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Di-n-octyl phthalate	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Fluoranthene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	0.026 J	0.046 J
Fluorene	0.22	0.18	< 0.040 U	< 0.040 U	0.62 J+	6.1
Hexachlorobenzene	< 0.40 U	< 0.40 U	< 0.40 U	< 0.40 U	< 0.42 U	< 0.40 U
Hexachlorobutadiene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
hexachlorocyclopentadiene	< 15 U	< 15 U	< 15 U	< 15 U	< 16 U	< 15 U
Hexachloroethane	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Indeno(1,2,3-cd)pyrene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	< 0.042 U	< 0.040 U
Isophorone	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Naphthalene	4.0	3.1	< 0.060 U	< 0.060 U	< 0.063 U	< 0.060 U
Nitrobenzene	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
n-Nitrosodimethylamine	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
n-Nitroso-di-n-propylamine	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
n-Nitrosodiphenylamine	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	1.9
Pentachlorophenol	< 4.0 U	< 4.0 U	< 4.0 U	< 4.0 U	< 4.2 U	< 4.0 U
Phenanthrene	1.3	1.5	< 0.060 U	< 0.060 U	0.035 J	4.0
Phenol	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Pyrene	< 0.040 U	< 0.040 U	< 0.040 U	< 0.040 U	0.033 J	0.073
Tetrachlorobenzene, 1,2,4,5-	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
Tetrachlorophenol, 2,3,4,6-	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.1 U	< 1.0 U
VOCs						
1,1,1,2-Tetrachloroethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,1-Trichloroethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2,2-Tetrachloroethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
1,1,2-Trichloroethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethane	1	1	< 1 U	< 1 U	< 1 U	< 1 U
1,1-Dichloroethene	< 1 UJ	0.6 J	< 1 U	< 1 U	< 1 U	< 1 U
1,2,3-Trichlorobenzene	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
1,2,3-Trichloropropane	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
1,2-Dibromo-3-chloropropane	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
1,2-Dibromoethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloroethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,2-Dichloropropane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
1,4-Dioxane	< 200 U	< 200 U	< 200 U	< 200 U	< 200 U	< 200 U
2-Butanone	< 8 U	< 8 U	< 8 U	71	< 8 U	< 8 U
2-Hexanone	< 8 U	< 8 U	< 8 U	< 8 U	< 8 U	< 8 U
4-Methyl-2-pentanone	< 8 U	< 8 U	< 8 U	< 8 U	< 8 U	< 8 U
Acetone	< 20 U	< 20 U	< 20 U	52	< 20 U	< 20 U
Benzene	1	1	< 1 U	< 1 U	< 1 U	< 1 U
Bromochloromethane	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Bromodichloromethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromoform	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bromomethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Carbon disulfide	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Carbon tetrachloride	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chlorobenzene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U

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Location ID	CH-MW016	CH-MW016	CH-MW018	CH-MW019	CH-MW020	CH-MW021
Sample Date	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/15/2016	12/14/2016
Sample Type	FD	N	N	N	N	N
Chemical						
VOCs Continued						
Chloroethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloroform	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chloromethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cis-1,2-Dichloroethene	13	13	< 1 U	< 1 U	< 1 U	1
cis-1,3-Dichloropropene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
cyclohexane	3 J	3 J	< 4 U	< 4 U	< 4 U	< 4 U
Dibromochloromethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Dichlorodifluoromethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Ethylbenzene	2	2	< 1 U	< 1 U	< 1 U	< 1 U
Isopropylbenzene	8	8	< 2 U	< 2 U	< 2 U	5 J
m,p-Xylene	0.5 J	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U
Methyl tert-butyl ether	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylacetate	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
methylcyclohexane	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	3 J
Methylene chloride	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
o-Xylene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Styrene	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Tetrachloroethene	0.6 J	0.6 J	< 1 U	< 1 U	< 1 U	< 1 U
Toluene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,2-Dichloroethene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
trans-1,3-Dichloropropene	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Trichloroethene	29	29	< 1 U	< 1 U	< 1 U	2
Trichlorofluoromethane	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Vinyl Acetate	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U	< 4 U
Vinyl chloride	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Xylenes (total)	0.5 J	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U

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N - Normal sample.
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UJ - The analyte was not detected; and the reporting limit is approximate.
VOC - Volatile Organic Compound.

Table 5
Concrete Chip Analytical Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-107	CH-AOC-B113
Location ID	107-CC01	B113-CC01
Sample ID	107-CC01-01	B113-CC01-01
Sample Date	6/19/2016	6/21/2016
Depth Interval	0 - 0.5 cm	0 - 0.5 cm
Sample Type	N	N
Chemical		
PCBs		
Aroclor 1016	< 0.0065 UJ	< 6.7 U
Aroclor 1221	< 0.0065 UJ	< 6.7 U
Aroclor 1232	< 0.0065 UJ	< 6.7 U
Aroclor 1242	< 0.0065 UJ	< 6.7 U
Aroclor 1248	< 0.0065 UJ	< 6.7 U
Aroclor 1254	0.0092 J	210
Aroclor 1260	< 0.0065 UJ	< 6.7 U
Aroclor 1262	< 0.0065 UJ	< 6.7 U
Aroclor 1268	< 0.0065 UJ	< 6.7 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted.
< - Result not detected above laboratory reporting limit.
cm - Centimeter.
J - Estimated value.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.

Table 6
Wipe Analytical Results (Phase I)
Camp Hero Remedial Investigation
Montauk, New York

Location Group	CH-AOC-107	CH-AOC-B113
Location ID	107-WP01	B113-WP01
Sample ID	107-WP01-01	B113-WP01-01
Sample Date	6/19/2016	6/21/2016
Sample Type	N	N
Chemical		
PCBs		
Aroclor 1016	< 0.00025 UJ	< 0.0075 UJ
Aroclor 1221	< 0.00025 UJ	< 0.0075 U
Aroclor 1232	< 0.00025 UJ	< 0.0075 U
Aroclor 1242	< 0.00025 UJ	< 0.0075 U
Aroclor 1248	< 0.00025 UJ	< 0.0075 U
Aroclor 1254	< 0.00025 UJ	4.4 J+
Aroclor 1260	< 0.00025 UJ	< 0.0075 U

Notes:
All units are in milligrams per kilogram (mg/kg) unless otherwise noted.
< - Result not detected above laboratory reporting limit.
J+ - The chemical was positively identified; however, the associated numerical value is a high estimated concentration.
N - Normal sample.
PCB - Polychlorinated Biphenyl.
U - Not detected.
UJ - The analyte was not detected; and the reporting limit is approximate.

Appendix G

Groundwater Potability Analysis

TABLE OF CONTENTS

FIGURES

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CX	Center of Expertise
EM	Environmental and Munitions
FS	Feasibility Study
mL/min	milliliters per minute
msl	mean sea level
RAO	Remedial Action Objectives
RI	Remedial Investigation
SCDHS	Suffolk County Department of Health Services
SCWA	Suffolk County Water Authority
TPP	Technical Project Planning
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

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1.0 INTRODUCTION

A desktop potability analysis was completed for the United States Army Corps of Engineers (USACE) to assess whether perched groundwater at Camp Hero, New York could be considered a potential potable water supply. The results of this analysis will be considered by the project team in evaluating potential exposure scenarios and pathways, quantifying potential risks, and making risk-based decisions and defining overall project remedial action objectives (RAOs) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process.

This analysis reveals that the shallow perched groundwater at Camp Hero is not suitable as a potable water source. It should be considered unsuitable for drinking based on the groundwater characteristics and local (New York State and Suffolk County) drinking well standards. This analysis was completed by AECOM in coordination with the USACE New England and New York Districts, with technical guidance and input provided by the USACE Environmental and Munitions (EM) Center of Expertise (CX).

2.0 BACKGROUND

Camp Hero State Park is located on the eastern tip of the south fork of Long Island, NY, approximately five miles east of the Village of Montauk. The park consists of 469 acres and is bound by Montauk Highway (Route 27) to the north, the Atlantic Ocean to the south, Montauk Point State Park to the east, and Camp Hero State Park's undeveloped sanctuary area to the west. The landscape includes wooded areas, freshwater wetlands, and seaside bluffs.

The park was initially established in early 1942 as a Coastal Defense Installation. Military development included a series of underground bunkers, gun batteries, barracks, mess halls, hospital facilities, a motor repair shop, a recreation facility, sentry boxes, water supply and sewage facilities, and a radar tower. The military operations continued after 1952, when the park was renamed the Montauk Air Force Station, and generally ended in 1980 when remaining military personnel were transferred off-base and the park was subsequently conveyed to New York State as "Camp Hero State Park" in 1984.

A total of 47 potential Areas of Concern (AOCs) were identified for environmental investigation, and the CERCLA process was initiated by USACE in 2015. At the time, this potability analysis was completed (March 2017), the USACE team was continuing to implement the Remedial Investigation and Feasibility Study (RI/FS) phase of study under the CERCLA process. As part of this study, a Technical Project Planning (TPP) meeting was conducted on February 23, 2017 to align team objectives for the Phase III RI field investigation. The TPP team recommended conducting an evaluation of the shallow perched groundwater at Camp Hero to assess whether it is suitable as a theoretical drinking water source. Information inputs for this study include the perched groundwater characteristics at Camp Hero, as well as relevant New York State and Suffolk County Department of Health Services Standards for community and private water well systems.

3.0 ANALYSIS

In the Camp Hero area, drinking water wells obtain water from a confined freshwater lens located below ground at a depth generally 5 to 10 feet above mean sea level (msl). This freshwater lens used for drinking water is confined from the perched groundwater above by thick layers of silt and clay, which prevents downward movement of perched water from near the ground surface to the confined aquifer.

The perched water bodies are generally small lenses of water temporarily stored in thin layers of more permeable material near the ground surface, underlain by the less permeable silt and clay beds. The perched groundwater generally flows horizontally and discharges to nearby topographically low areas such as streams, wetlands, or shores of Camp Hero.

Based on the installation of site-wide perched groundwater wells during the RI field investigations, the perched groundwater at Camp Hero is generally encountered at depths ranging from approximately 5 to 30 feet below ground surface (bgs), and was absent in some areas. Through monitoring well development and low-flow sampling activities, the perched groundwater exhibits a low yield, has high turbidity, and can be seasonal in nature. All perched groundwater wells were quickly purged dry utilizing low-flow pumping techniques of less than 500 milliliters per minute (mL/min). In addition, all the perched groundwater wells required a long period of time, ranging from a few hours to over 24 hours, to recharge groundwater water to the well. These characteristics demonstrate an insufficient sustainable yield.

Because of the low well yield, high turbidity, and poor water quality of perched groundwater, it has not historically been considered as a drinking water source. Instead, the only drinking water well in proximity to the study area is located at the Montauk Lighthouse, which is northeast and hydraulically upgradient from Camp Hero, and is constructed in the deeper confined aquifer, an estimated 70 feet below the perched groundwater zone at this location. The depth of the confined aquifer and location of Montauk Lighthouse drinking water well is shown on Figure 1. The groundwater flow direction in the confined aquifer is shown on Figure 2.

At Camp Hero, all drinking water is currently supplied by the Suffolk County Water Authority (SCWA). An SCWA water supply line is located at the western entrance of Camp Hero and runs along the Camp Hero Road to Building 3001 within the park. The SCWA obtains water from wells constructed in the confined aquifer at wellfields located west of Camp Hero.

If one were to explore the potential installation of a potable groundwater well at Camp Hero, the well would be required to conform to standards for community or private water wells issued by New York State Health Services or Suffolk County Department of Health Services (SCDHS). These standards apply to water well capacity, water quality, and construction. The groundwater characteristics of perched groundwater at Camp Hero would not qualify under these standards and thus, would not be permitted as viable drinking water wells through the New York State and Suffolk County permitting system. Relevant citations from these standards are listed below for ease of reference.

- *SCDHS Standard 406.4-.1 An approval to construct will be granted only where the department has made a determination that no public water supply is available.*

  As the SCWA currently supplies drinking water to Camp Hero, it is unlikely that perched groundwater wells would be permitted.

- *SCDHS Standard 406.4-2 Private water system wells serving single family residences must be capable of providing a continuous yield of at least 5 gallons per minute, measured at the outlet of the storage tank. An additional yield of 5 gallons per minute must be provided for each additional dwelling unit, e.g., 20 gpm for a four-unit residence.*

  The perched aquifer at Camp Hero is typically thin and located within in low permeability silt and clay units. The perched wells have low to no yield (dry). All wells installed in the perched aquifer during the RI field investigations were purged dry utilizing low flow pumping techniques of less than 500 ml/min.

- *SCDHS Standard 406.4-4 The total minimum well depth required is 50 feet and the top of the well screen must be installed at least 40 feet below the water table.*

  The thickness of the perched groundwater at Camp Hero is typically thin within interbedded silt and clay units. The thin perched water bearing units would not meet the well construction standard requirements.

- *SCDHS Standard 406.4-13 Water quality of all private water systems for new construction must be tested as a condition for receiving final approval from the department. The laboratory must certify that the samples were representative of raw water quality, not filtered or treated.*

  Based on site-wide installation, sampling, and laboratory analysis of perched water wells, the unfiltered perched groundwater will be not pass drinking water quality standards published with this standard.

4.0 CONCLUSIONS

This analysis reveals that the shallow perched groundwater at Camp Hero is not suitable as a potable water source. It should be considered unsuitable for drinking based on the groundwater characteristics and New York State and Suffolk County drinking well standards. The project team may still decide to evaluate a potential future drinking water exposure pathway as part of the human health risk assessment based on CERCLA requirements for assessing conservative and theoretical future use scenarios. However, the remedial investigation may eliminate the drinking water exposure pathway from consideration in the feasibility study based on the findings of this potability assessment which demonstrates the unsuitability of perched groundwater for use as a drinking water source.

5.0 REFERENCES

Suffolk County Department of Health Services, Private Water Systems Standards, Issued May 1985, Revised July 1992.

United States Geological Survey (USGS) Open File Report 96-457, 1997. Hydrogeologic-Setting Classification for Suffolk County, Long Island, New York, with Results of Selected Aquifer-Test Analyses. Prepared in cooperation with the Suffolk County Water Authority, Suffolk County Department of Health Service

USGS Water-Resources Investigations Report 85-4013, 1986. Groundwater-Resource Assessment of the Montauk Area, Long Island, New York. Prepared in cooperation with the Suffolk County Water Authority, Suffolk County Department of Health Service.

USGS, 2013. (https://www.sciencebase.gov) A raster data set interpolated from water level data collected representing a continuous surface of the estimated depth to water for hydrologic conditions on Long Island, New York. Contours were constructed at a scale of 1:125,000 from water-level data collected at 335 groundwater monitoring wells. The water table altitude contours were digitized and compared to 1997, 2006, and 2010 water table altitude maps.

Figures

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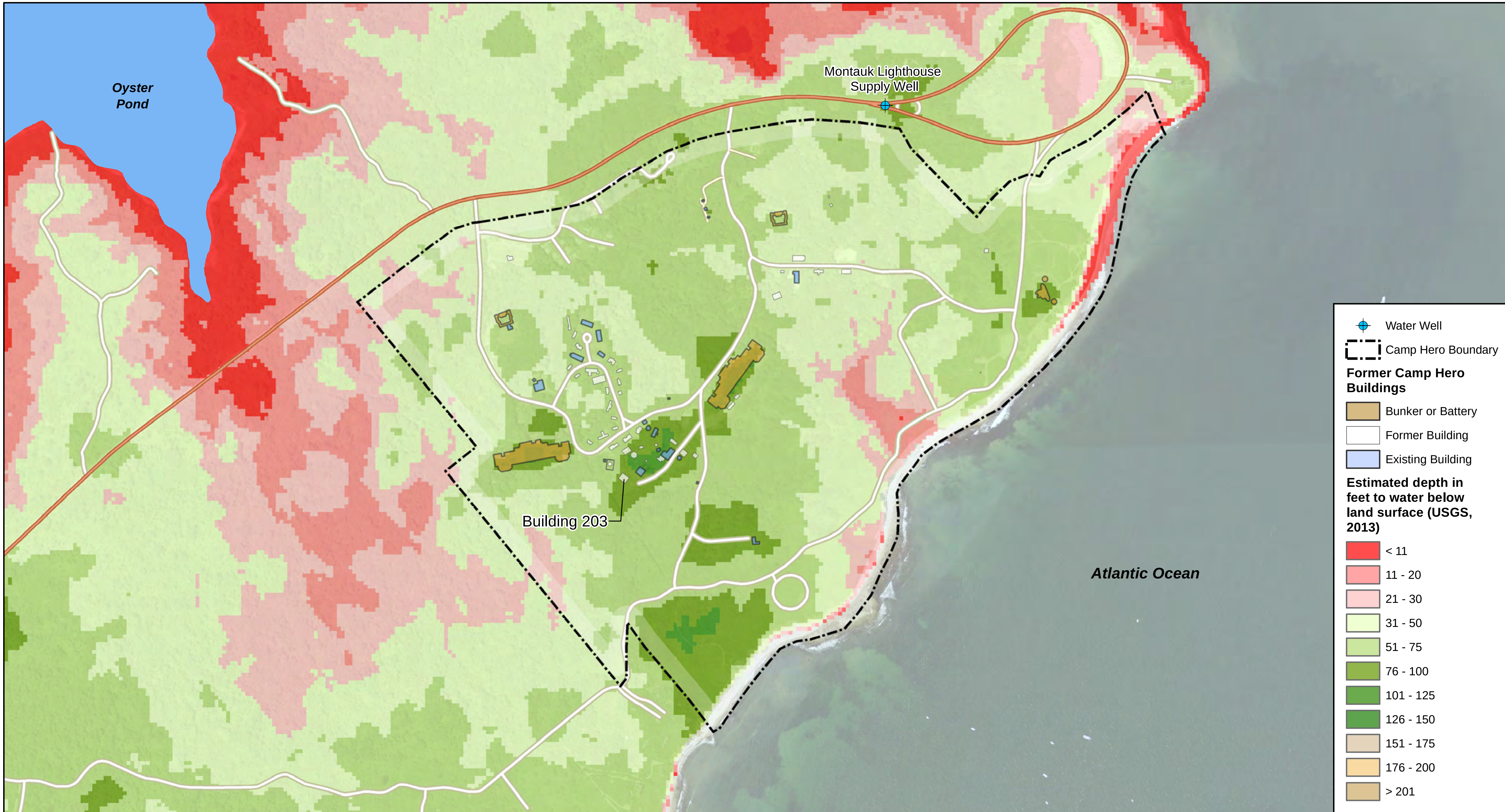

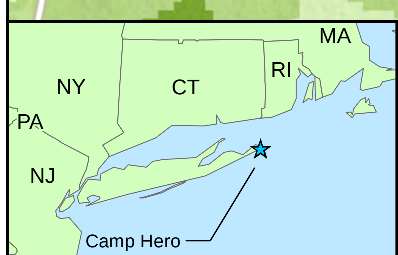

MAP LOCATION

Description of depth to Water raster obtained via U.S. Geological Survey (https://www.sciencebase.gov): "The depth to water table was measured at 335 groundwater monitoring wells (observation and supply) screened in the upper glacial and Magothy aquifers during April and May of 2013. This raster data set was interpolated from the water level data collected at those sites and represents a continuous surface of the estimated depth to water for hydrologic conditions on Long Island, New York (USGS, 2013)."

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
Datum: North American 1983

0 800 1,600 Feet

1 inch = 800 feet

AECOM

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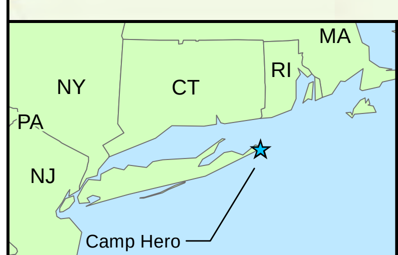
Depth to the Confined Freshwater Lens

Camp Hero RI

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	January 2017	Figure 1

1/25/2017 1:9,600 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig x Depth to Water.mxd



MAP LOCATION

Description of depth to Water raster obtained via U.S. Geological Survey (https://www.sciencebase.gov): "The U.S. Geological Survey constructed a water table altitude map using ground-water levels measured in the upper glacial and Magothy aquifers during the spring of 2013. Contours were constructed at a scale of 1:125,000 from water-level data collected at 335 groundwater monitoring wells. The water table altitude contours were digitized and compared to 1997, 2006, and 2010 water table altitude maps (USGS, 2013)."

Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet
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0 800 1,600 Feet

1 inch = 800 feet

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Confined Freshwater Lens
Direction of Groundwater Flow

Camp Hero RI

PROJECT NO.	PREPARED BY:	DATE:	
60443903	ACC	January 2017	**Figure 2**

1/25/2017 1:9,600 Y:\Projects\Camp_Hero\Maps\Phase II Workplan\Fig x Surface of Water-Table Aquifer.mxd

Appendix H

Community Air Monitoring Plan

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New York State Department of Health
Generic Community Air Monitoring Plan
(Appendix 1A of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation)

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels, and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

<u>Particulate Monitoring, Response Levels, and Actions</u>

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Memorandum for Community Air Monitoring Plan
Final Work Plan
Remedial Investigation
Former Camp Hero, Montauk, New York

To protect the community from any potential airborne releases that could result from field activities associated with the remedial investigation, community air monitoring will be performed in general accordance with the NYSDOH Generic CAMP, Attachment 1A of the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, included as Appendix B (NYSDEC 2010b). A CAMP is typically required by the NYSDEC whenever intrusive work is conducted as part of an environmental investigation or remediation.

Per DER-10, continuous air monitoring will be performed in the vicinity of each drill rig when intrusive activities are underway. Air monitoring will consist of VOC monitoring with a photoionization detector (PID) and a dust monitor placed on a tripod adjacent to the work areas, in a downwind location. Background (upwind) levels will be measured each day prior to start-up of site activities and periodically throughout the day. Per the NYSDOH Generic CAMP (Appendix B), the following actions will be taken if acceptable levels of air impacts are exceeded:

- If VOCs exceed 5 ppm above background for a 15-minute average, work activities will be temporarily stopped and monitoring will continue. Work activities can resume with continued monitoring if VOCs readily decrease to below 5 ppm above background.

- If VOCs exceed between 5 and 25 ppm above background for a 15-minute average, work will be stopped, the source of the emissions will be identified, and corrective measures will be implemented. See Appendix B for requirements to resume work.

- If particulate levels (PM10) are greater than 100 $\mu g/m^3$ above background for a 15 minute period, or if airborne dust is observed leaving the work area, dust suppression techniques will be employed. Work will continue with these suppression techniques provided that PM10 levels do not exceed 150 $\mu g/m^3$ above background and no visible dust is migrating from the work area. If PM10 exceeds 150 $\mu g/m^3$ over background, work will be stopped, and a re-evaluation of activities will be initiated.

Signed:

Mark MacEwan

Mark MacEwan
Project Manager
AECOM-Tidewater JV

Appendix I

Field Standard Operating Procedures

SOP 3-01	Utility Clearance
SOP 3-02	Logbooks
SOP 3-03	Recordkeeping, Sample Labeling, and Chain-of-Custody
SOP 3-04	Sample Handling, Storage, and Shipping
SOP 3-05	Investigation-Derived Waste Management
SOP 3-06	Equipment Decontamination
SOP 3-07	Land Surveying
SOP 3-10	Surface Water and Liquid Sampling
SOP 3-12	Monitoring Well Installation
SOP 3-13	Monitoring Well Development
SOP 3-14	Monitoring Well Sampling
SOP 3-15	Monitoring Well and Borehole Abandonment
SOP 3-16	Soil and Rock Classification
SOP 3-17	Direct Push Sampling Techniques
SOP 3-18	Field Analysis of Ferrous Iron Using the HACH DR890 Colorimeter and HACH Method 8146
SOP 3-20	Operation and Calibration of a Photoionization Detector
SOP 3-21	Surface and Subsurface Soil Sampling Procedures
SOP 3-22	Sediment Sampling
SOP 3-24	Water Quality Parameter Testing for Groundwater Sampling
SOP 3-35	In-Situ Hydraulic Conductivity Testing via Rising or Falling Head Slug Testing
ASTM D1587	Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes

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Utility Clearance

Procedure 3-01

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the process for determining the presence of subsurface utilities and other cultural features at locations where planned site activities involve the physical disturbance of subsurface materials.

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM under contract to the Unites States Army Corp of Engineers (USACE).

1.3 The procedure applies to the following activities: soil gas surveying, excavating, trenching, drilling of borings and installation of monitoring and extraction wells, use of soil recovery or slide-hammer hand augers, and all other intrusive sampling activities.

1.4 The primary purpose of the procedure is to minimize the potential for damage to underground utilities and other subsurface features, which could result in physical injury, disruption of utility service, or disturbance of other subsurface cultural features.

1.5 If there are procedures, whether it be from AECOM, state, and/or federal, that are not addressed in this SOP and are applicable to utility clearance, those procedures should be added as an appendix to the project specific SAP.

1.6 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 Field and subcontractor personnel shall adhere to a site-specific Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP).

3.0 Terms and Definitions

3.1 **Utility**

For the proposes of this SOP, a utility is defined as a manmade underground line or conduit, cable, pipe, vault or tank that is, or was, used for the transmission of material or energy (e.g., gas, electrical, telephone, steam, water or sewage, product transfer lines, or underground storage tanks).

3.2 **As-Built Plans**

As-built plans are plans or blueprints depicting the locations of structures and associated utilities on a property.

3.3 **One-Call**

The Utility Notification Center is the one-call agency for nationwide call before you dig. The Utility Notification Center is open 24 hours a day, and accepts calls from anyone planning to dig. The phone number 811 is the designated call before you dig phone number that directly connects you to your local one-call center. Additional information can be found at www.call811.com.

Calling before you dig ensures that any publicly owned underground lines will be marked so that you can dig around them safely. Having the utility lines marked not only prevents accidental damage to the lines, but prevents property damage and personal injuries that could result in breaking a line.

The following information will need to be provided when a call is placed to One-Call:

- Your name, phone number, company name (if applicable), and mailing address.
- What type or work is being done.
- Who the work is being done for.
- The county and city the work is taking place in.
- The address or the street where the work is taking place.
- Marking instructions, (specific instructions as to where the work is taking place).

Under normal circumstances it takes between 2 to 5 days from the time you call (not counting weekends or holidays) to have the underground lines marked. Because these laws vary from state to state, exactly how long it will take depends on where your worksite is located. You will be given an exact start time and date when your locate request is completed, which will comply with the laws in your area.

In the event of an emergency (any situation causing damage to life or property, or a service outage), lines can be marked sooner than the original given time if requested.

3.4 Toning

Toning is the process of surveying an area utilizing one or more surface geophysical methods to determine the presence or absence of underground utilities. Typically, toning is conducted after identifying the general location of utilities and carefully examining all available site utility plans. Each location is marked according to the type of utility being identified. In addition, areas cleared by toning are flagged or staked to indicate that all identified utilities in a given area have been toned.

4.0 Training and Qualifications

4.1 The **Project Manager** is responsible for verifying that these utility locating procedures are performed prior to the initiation of active subsurface exploration.

4.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

4.3 The **Site Supervisor** is responsible for ensuring that all utility locating activities are performed in accordance with this procedure.

4.4 All **Field Personnel** are responsible for the implementation of this procedure.

5.0 Equipment and Supplies

5.1 Equipment and supplies necessary for locating subsurface utilities will be provided by the subcontractor; however, the project **Site Supervisor/Field Personnel** will provide any additional equipment and supplies as needed as well as maintain information regarding the utility clearance activities in the field logbook.

6.0 Procedure

Proceed wtih the following steps where subsurface exploration will include excavations, drilling, or any other subsurface investigative method that could damage utilities at a site. In addition to the steps outlined below, always exercise caution while conducting subsurface exploratory work.

6.1 **Prepare Preliminary Site Plan**

- Prepare a preliminary, scaled site plan depicting the proposed exploratory locations as part of the project specific Sampling and Analysis Plan (SAP) or Work Plan. Include as many of the cultural and natural features as practical in this plan.

6.2 **Review Background Information**

- Search existing plan files to review the as-built plans to identify the known location of utilities at the site. Plot the locations of utilities identified onto a preliminary, scaled site plan. Inform the CTO Manager if utilities lie within close proximity to a proposed exploration or excavation location. The Project Manager will determine if it is necessary to relocate proposed sampling or excavation locations.
- Include the utility location information gathered during previous investigations (e.g., remedial investigation or remedial site evaluation) in the project design documents for removal or remedial actions. In this manner, information regarding utility locations collected during implementation of a project can be shared with the subcontractor during implementation of a particular task order. In many instances, this will help to reduce the amount of additional geophysical surveying work the subcontractor may have to perform.
- Conduct interviews with onsite and facility personnel familiar with the site to obtain additional information regarding the known and suspected locations of underground utilities. In addition, if appropriate, contact shall be made with local utility companies to request their help in locating underground lines. Pencil in the dimensions, orientation, and depth of utilities, other than those identified on the as-built plans, at their approximate locations on the preliminary plans. Enter the type of utility, the personnel who provided the information, and the date the information was provided into the field log.
- During the pre-field work interviewing process, the interviewer will determine which site personnel should be notified in the event of an incident involving damage to existing utilities. Record this information in the field logbook with the corresponding telephone numbers and addresses.

6.3 **Site Visit/Locate Utilities/Toning**

- Prior to the initiation of field activities, the Site Supervisor similarly qualified field personnel shall visit the site and note existing structures and evidence of associated utilities, such as fire hydrants, irrigation systems, manhole and vault box covers, standpipes, telephone switch boxes, free-standing light poles, gas or electric meters, pavement cuts, and linear depression. Compare notes of the actual site configuration to the preliminary site plan. Note deviations in the field logbook and on the preliminary site plan. Accurately locate or survey and clearly mark with stakes, pins, flags, paint, or other suitable devices all areas where subsurface exploration is proposed. These areas shall correspond with the locations drawn on the preliminary site plan.
- Following the initial site visit by the Site Supervisor, a trained utility locating subcontractor will locate, identify, and tone all utilities depicted on the preliminary site plan. The Field Task Manager or similarly qualified field personnel shall visit the site and identify the areas of subsurface disturbance with white spray paint, chalk, white pin flags or some other easily identifiable marking. The utility locator should utilize appropriate sensing equipment to attempt to locate utilities that might not have appeared on the as-built plans. At a minimum, the utility subcontractor should utilize a metal detector and/or magnetometer; however, it is important to consider the possibility that non-metallic utilities or tanks might be present at the site. Use other appropriate surface geophysical methods such as Ground Penetrating Radar, Radiodetection, etc. as appropriate. Clear proposed exploration areas of all utilities in the immediate area where subsurface exploration is proposed. Clearly tone all anomalous areas. Clearly identify all toned areas on the preliminary site plan. All utilities near the area of subsurface disturbance should also be marked out by the utility subcontractor using the universal colors for subsurface utilities (i.e., red – electric; blue – water; green – sewer; yellow – gas; etc.). After toning the site and plotting all known or suspected buried utilities on the preliminary site plan, the utility locator shall provide the Field Task Manager with a copy of the completed preliminary

site plan. Alternatively, the Site Supervisoror designee shall document the results of the survey on the preliminary site plan.

- Report to the Site Supervisor anomalous areas detected and toned that are in close proximity to the exploration or excavation areas. The Field Task Manager shall determine the safe distance to maintain from the known or suspected utility. It may be necessary to relocate the proposed exploration or excavation areas. If this is required, the Site Supervisor or designee shall relocate them and clearly mark them using the methods described above. Completely remove the markings at the prior location. Plot the new locations on the site plan and delete the prior locations from the plan. In some instances, such as in areas extremely congested with subsurface utilities, it may be necessary to dig by hand or use techniques such as air knife to determine the location of the utilities.

6.4 **Prepare Site Plan**

- Prior to the initiation of field activities, draft a final site plan that indicates the location of subsurface exploration areas and all known or suspected utilities present at the site. Provide copies of this site plan to the USACE and the subcontractor who is to conduct the subsurface exploration/excavation work. Review the site plan with the NTR to verify its accuracy prior to initiating subsurface sampling activities.

7.0 Quality Control and Assurance

7.1 Utility locating must incorporate quality control measures to ensure conformance to these and the project requirements.

8.0 Records, Data Analysis, Calculations

8.1 A bound field logbook will be kept detailing all activities conducted during the utility locating procedure.

8.2 The logbook will describe any changes and modifications made to the original exploration plan. The trained utility locator shall prepare a report and keep it in the project file. Also, a copy of the final site plan will be kept in the project file.

9.0 Attachments or References

Department of Defense, United States (DoD). 2005. *Uniform Federal Policy for Quality Assurance Project Plans, Part 1: UFP-QAPP Manual.* Final Version 1. DoD: DTIC ADA 427785, EPA-505-B-04-900A. In conjunction with the U. S. Environmental Protection Agency and the Department of Energy. Washington: Intergovernmental Data Quality Task Force. March. On-line updates available at: http://www.epa.gov/fedfac/pdf/ufp_qapp_v1_0305.pdf.

Author	Reviewer	Revisions (Technical or Editorial)
Caryn DeJesus Senior Scientist	Bob Shoemaker Senior Scientist	Rev 0 – Initial Issue (June 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Logbooks

Procedure 3-02

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the activities and responsibilities pertaining to the identification, use, and control of logbooks and associated field data records.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 In order to keep the logbook clean, store it in a clean location and use it only when outer gloves used for PPE have been removed.

3.0 Terms and Definitions

3.1 **Logbook**

A logbook is a bound field notebook with consecutively numbered, water-repellent pages that is clearly identified with the name of the relevant activity, the person assigned responsibility for maintenance of the logbook, and the beginning and ending dates of the entries.

3.2 **Data Form**

A data form is a predetermined format utilized for recording field data that may become, by reference, a part of the logbook (e.g., soil boring logs, trenching logs, surface soil sampling logs, groundwater sample logs, and well construction logs are data forms).

4.0 Training and Qualifications

4.1 The **Project Manager** or **designee** is responsible for determining which team members shall record information in field logbooks and for obtaining and maintaining control of the required logbooks. The **Project Manager** shall review the field logbook on at least a monthly basis. The **Project Manager** or **designee** is responsible for reviewing logbook entries to determine compliance with this procedure and to ensure that the entries meet the project requirements.

4.2 A knowledgeable individual such as the **Site Supervisor, Project Manager**, or **Program Quality Manager** shall perform a technical review of each logbook at a frequency commensurate with the level of activity (weekly is suggested, or, at a minimum, monthly). Document these reviews by the dated signature of the reviewer on the last page or page immediately following the material reviewed.

4.3 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

4.4 The **Site Supervisor** is responsible for ensuring that all **field personnel** follow these procedures and that the logbook is completed properly and daily. The **Site Supervisor** is also responsible for submitting copies to the **Project Manager**, who is responsible for filing them and submitting a copy (if required by the Statement of Work).

4.5 The **logbook user** is responsible for recording pertinent data into the logbook to satisfy project requirements and for attesting to the accuracy of the entries by dated signature. The **logbook user** is also responsible for safeguarding the logbook while having custody of it.

4.6 All **field personnel** are responsible for the implementation of this procedure.

5.0 Equipment and Supplies

5.1 Field logbooks shall be bound field notebooks with water-repellent pages.

5.2 Pens shall have indelible black ink.

6.0 Procedure

6.1 The field logbook serves as the primary record of field activities. Make entries chronologically and in sufficient detail to allow the writer or a knowledgeable reviewer to reconstruct the applicable events. Store the logbook in a clean location and use it only when outer gloves used for personal protective equipment (PPE) have been removed.

6.2 Individual data forms may be generated to provide systematic data collection documentation. Entries on these forms shall meet the same requirements as entries in the logbook and shall be referenced in the applicable logbook entry. Individual data forms shall reference the applicable logbook and page number. At a minimum, include names of all samples collected in the logbook even if they are recorded elsewhere.

6.3 Enter field descriptions and observations into the logbook, as described in Attachment 1, using indelible black ink.

6.4 Typical information to be entered includes the following:

- Dates (month/day/year) and times (military) of all on-site activities and entries made in logbooks/forms;
- Site name and description;
- Site location by longitude and latitude, if known;
- Weather conditions, including temperature and relative humidity;
- Fieldwork documentation, including site entry and exit times;
- Descriptions of, and rationale for, approved deviations from the work plan (WP) or field sampling plan;
- Field instrumentation readings;
- Names, job functions, and organizational affiliations of on-site personnel;
- Photograph references;
- Site sketches and diagrams made on site;
- Identification and description of sample morphology, collection locations, and sample numbers;
- Sample collection information, including dates (month/day/year) and times (military) of sample collections, sample collection methods and devices, station location numbers, sample collection depths/heights, sample preservation information, sample pH (if applicable), analysis requested (analytical groups), etc., as well as chain-of-custody (COC) information such as sample identification numbers cross-referenced to COC sample numbers;
- Sample naming convention;
- Field quality control (QC) sample information;
- Site observations, field descriptions, equipment used, and field activities accomplished to reconstruct field operations;

- Meeting information;
- Important times and dates of telephone conversations, correspondence, or deliverables;
- Field calculations;
- PPE level;
- Calibration records;
- Contractor and subcontractor information (address, names of personnel, job functions, organizational affiliations, contract number, contract name, and work assignment number);
- Equipment decontamination procedures and effectiveness;
- Laboratories receiving samples and shipping information, such as carrier, shipment time, number of sample containers shipped, and analyses requested; and
- User signatures.

6.5 The logbook shall reference data maintained in other logs, forms, etc. Correct entry errors by drawing a single line through the incorrect entry, then initialing and dating this change. Enter an explanation for the correction if the correction is more than for a mistake.

6.6 At least at the end of each day, the person making the entry shall sign or initial each entry or group of entries.

6.7 Enter logbook page numbers on each page to facilitate identification of photocopies.

6.8 If a person's initials are used for identification, or if uncommon acronyms are used, identify these on a page at the beginning of the logbook.

6.9 At least weekly and preferably daily, the **preparer** shall photocopy and retain the pages completed during that session for backup. This will prevent loss of a large amount of information if the logbook is lost.

7.0 Quality Control and Assurance

7.1 Review per Section 4.2 shall be recorded.

8.0 Records, Data Analysis, Calculations

8.1 Retain the field logbook as a permanent project record. If a particular CTO requires submittal of photocopies of logbooks, perform this as required.

8.2 Deviations from this procedure shall be documented in field records. Significant changes shall be approved by the **Program Quality Manager**.

9.0 Attachments or References

9.1 Attachment 1 – Description of Logbook Entries

9.2 Department of Defense, United States (DoD). 2005. *Uniform Federal Policy for Quality Assurance Project Plans, Part 1: UFP-QAPP Manual*. Final Version 1. DoD: DTIC ADA 427785, EPA-505-B-04-900A. In conjunction with the U. S. Environmental Protection Agency and the Department of Energy. Washington: Intergovernmental Data Quality Task Force. March. On-line updates available at: http://www.epa.gov/fedfac/pdf/ufp_qapp_v1_0305.pdf.

Author	Reviewer	Revisions (Technical or Editorial)
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue \
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; convert to AECOM SOP for use on USACE HTRW projects (APril 2017)

Attachment 1
Description of Logbook Entries

Logbook entries shall be consistent with Section A.1.4 *Field Documentation SOPs* of the UFP-QAPP Manual (DoD 2005) and contain the following information, as applicable, for each activity recorded. Some of these details may be entered on data forms, as described previously.

Name of Activity	For example, Asbestos Bulk Sampling, Charcoal Canister Sampling, Aquifer Testing.
Task Team Members and Equipment	Name all members on the field team involved in the specified activity. List equipment used by serial number or other unique identification, including calibration information.
Activity Location	Indicate location of sampling area as indicated in the field sampling plan.
Weather	Indicate general weather and precipitation conditions.
Level of PPE	Record the level of PPE (e.g., Level D).
Methods	Indicate method or procedure number employed for the activity.
Sample Numbers	Indicate the unique numbers associated with the physical samples. Identify QC samples.
Sample Type and Volume	Indicate the medium, container type, preservative, and the volume for each sample.
Time and Date	Record the time and date when the activity was performed (e.g., 0830/08/OCT/89). Use the 24-hour clock for recording the time and two digits for recording the day of the month and the year.
Analyses	Indicate the appropriate code for analyses to be performed on each sample, as specified in the WP.
Field Measurements	Indicate measurements and field instrument readings taken during the activity.
Chain of Custody and Distribution	Indicate chain-of-custody for each sample collected and indicate to whom the samples are transferred and the destination.
References	If appropriate, indicate references to other logs or forms, drawings, or photographs employed in the activity.
Narrative (including time and location)	Create a factual, chronological record of the team's activities throughout the day including the time and location of each activity. Include descriptions of general problems encountered and their resolution. Provide the names and affiliations of non-field team personnel who visit the site, request changes in activity, impact the work schedule, request information, or observe team activities. Record any visual or other observations relevant to the activity, the contamination source, or the sample itself. It should be emphasized that logbook entries are for recording data and chronologies of events. The logbook author must include observations and descriptive notations, taking care to be objective and recording no opinions or subjective comments unless appropriate.
Recorded by	Include the signature of the individual responsible for the entries contained in the logbook and referenced forms.
Checked by	Include the signature of the individual who performs the review of the completed entries.

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Recordkeeping, Sample Labeling, and Chain-of-Custody

Procedure 3-03

1.0 Purpose and Scope

1.1 The purpose of this standard operating procedure is to establish standard protocols for all field personnel for use in maintaining field and sampling activity records, writing sample logs, labeling samples, ensuring that proper sample custody procedures are utilized, and completing chain-of-custody/analytical request forms.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

Not applicable.

3.0 Terms and Definitions

3.1 Logbook

A logbook is a bound field notebook with consecutively numbered, water-repellent pages that is clearly identified with the name of the relevant activity, the person responsible for maintenance of the logbook, and the beginning and ending dates of the entries.

3.2 Chain-of-Custody

Chain-of-custody (COC) is documentation of the process of custody control. Custody control includes possession of a sample from the time of its collection in the field to its receipt by the analytical laboratory, and through analysis and storage prior to disposal.

4.0 Training and Qualifications

4.1 The **Project Manager** is responsible for determining which team members shall record information in the field logbook and for checking sample logbooks and COC forms to ensure compliance with these procedures. The **Project Manager** shall review COC forms on a monthly basis at a minimum.

4.2 The **Project Manager** and **Program Quality Manager** are responsible for evaluating project compliance with the Project Procedures Manual.

4.3 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

4.4 The **Laboratory Project Manager** or **Sample Control Department Manager** is responsible for reporting any sample documentation or COC problems to the **Project Manager** or **Laboratory Coordinator** within 24 hours of sample receipt.

4.5 The **Site Supervisor** is responsible for ensuring that all **field personnel** follow these procedures. The **Laboratory Coordinator** is responsible for verifying that the COC/analytical request forms have been completed properly and match the sampling and analysis plan. The **Project Manager** or **Laboratory Coordinator** is responsible for notifying the **laboratory**, **data managers**, and **data validators** in writing if analytical request changes are required as a corrective action. These small changes are different from change orders, which involve changes to the scope of the subcontract with the laboratory and must be made in accordance with a respective contract (e.g., remedial action contract).

4.6 All **field personnel** are responsible for following these procedures while conducting sampling activities. **Field personnel** are responsible for recording pertinent data into the logbook to satisfy project requirements and for attesting to the accuracy of the entries by dated signature.

5.0 Procedure

This procedure provides standards for documenting field activities, labeling the samples, documenting sample custody, and completing COC/analytical request forms. The standards presented in this section shall be followed to ensure that samples collected are maintained for their intended purpose and that the conditions encountered during field activities are documented.

5.1 Recordkeeping

The field logbook serves as the primary record of field activities. Make entries chronologically and in sufficient detail to allow the writer or a knowledgeable reviewer to reconstruct each day's events. Field logs such as soil boring logs and ground-water sampling logs will also be used. These procedures are described in Procedure 3-02, *Logbooks*.

5.2 Sample Labeling

Affix a sample label with adhesive backing to each individual sample container. Place clear tape over each label (preferably prior to sampling) to prevent the labels from tearing off, falling off, being smeared, and to prevent loss of information on the label. Record the following information with a waterproof marker on each label:

- Project name or number (optional);
- COC sample number;
- Date and time of collection;
- Sampler's initials;
- Matrix (optional);
- Sample preservatives (if applicable); and
- Analysis to be performed on sample (this shall be identified by the method number or name identified in the subcontract with the laboratory).

These labels may be obtained from the analytical laboratory or printed from a computer file onto adhesive labels.

5.3 Custody Procedures

For samples intended for chemical analysis, sample custody procedures shall be followed through collection, transfer, analysis, and disposal to ensure that the integrity of the samples is maintained. Maintain custody of samples in accordance with the U.S. Environmental Protection Agency (EPA) COC guidelines prescribed in EPA *NEIC Policies and Procedures*, National Enforcement Investigations Center, Denver, Colorado, revised May 1986; EPA *RCRA Ground Water Monitoring Technical Enforcement Guidance Document* (TEGD); *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA OSWER Directive 9355 3-01); Appendix 2 of the *Technical Guidance Manual for Solid Waste Water Quality Assessment Test (SWAT) Proposals and Reports*; and *Test Methods for Evaluating Solid Waste* (EPA SW-846)

A description of sample custody procedures is provided below.

5.3.1 **Sample Collection Custody Procedures**

According to the U.S. EPA guidelines, a sample is considered to be in custody if one of the following conditions is met:

- It is in one's actual physical possession or view;
- It is in one's physical possession and has not been tampered with (i.e., it is under lock or official seal);
- It is retained in a secured area with restricted access; and
- It is placed in a container and secured with an official seal such that the sample cannot be reached without breaking the seal.

Place custody seals on sample containers immediately after sample collection and on shipping coolers if the cooler is to be removed from the sampler's custody. Place custody seals in such a manner that they must be broken to open the containers or coolers. Label the custody seals with the following information:

- Sampler's name or initials; and
- Date and time that the sample/cooler was sealed.

These seals are designed to enable detection of sample tampering. An example of a custody seal is shown in Attachment 1.

Field personnel shall also log individual samples onto COC forms (carbon copy or computer generated) when a sample is collected. These forms may also serve as the request for analyses. Procedures for completing these forms are discussed in Section 7.4, indicating sample identification number, matrix, date and time of collection, number of containers, analytical methods to be performed on the sample, and preservatives added (if any). The **samplers** will also sign the COC form signifying that they were the personnel who collected the samples. The COC form shall accompany the samples from the field to the laboratory. When a cooler is ready for shipment to the analytical laboratory, the **person delivering the samples for transport** will sign and indicate the date and time on the accompanying COC form. One copy of the COC form will be retained by the **sampler** and the remaining copies of the COC form shall be placed inside a self-sealing bag and taped to the inside of the cooler. Each cooler must be associated with a unique COC form. Whenever a transfer of custody takes place, **both parties** shall sign and date the accompanying carbon copy COC forms, and the **individual relinquishing the samples** shall retain a copy of each form. One exception is when the samples are shipped; the **delivery service personnel** will not sign or receive a copy because they do not open the coolers. The **laboratory** shall attach copies of the completed COC forms to the reports containing the results of the analytical tests. An example COC form is provided in Attachment 2.

5.3.2 **Laboratory Custody Procedures**

The following custody procedures are to be followed by an **independent laboratory** receiving samples for chemical analysis; the procedures in their Naval Facilities Engineering Service Center-evaluated Laboratory Quality Assurance Plan must follow these same procedures. A **designated sample custodian** shall take custody of all samples upon their arrival at the analytical laboratory. The **custodian** shall inspect all sample labels and COC forms to ensure that the information is consistent, and that each is properly completed. The **custodian** will also measure the temperature of the temperature blank in the coolers upon arrival using either a National Institute for Standards and Technology calibrated thermometer or an infra-red temperature gun. The **custodian** shall note the condition of the samples including:

- If the samples show signs of damage or tampering;
- If the containers are broken or leaking;
- If headspace is present in sample vials;
- If proper preservation of samples has occurred (made by pH measurement, except volatile organic compounds [VOCs] and purgeable total petroleum hydrocarbons [TPH] and temperature). The pH of VOC and purgeable TPH samples will be checked by the **laboratory analyst** after the sample aliquot has been removed from the vial for analysis; and
- If any sample holding times have been exceeded.

All of the above information shall be documented on a sample receipt sheet by the **custodian**.

Discrepancies or improper preservation shall be noted by the **laboratory** as an out-of-control event and shall be documented on an out-of-control form with corrective action taken. The out-of-control form shall be signed and dated by the **sample control custodian** and **any other persons** responsible for corrective action. An example of an out-of-control form is included as Attachment 4.

The **custodian** shall then assign a unique laboratory number to each sample and distribute the samples to secured storage areas maintained at 4 degrees Celsius (soil samples for VOC analysis are to be stored in a frozen state until analysis). The unique laboratory number for each sample, COC sample number, client name, date and time received, analysis due date, and storage shall also be manually logged onto a sample receipt record and later entered into the laboratory's computerized data management system. The **custodian** shall sign the shipping bill and maintain a copy.

Laboratory personnel shall be responsible for the care and custody of samples from the time of their receipt at the laboratory through their exhaustion or disposal. Samples should be logged in and out on internal laboratory COC forms each time they are removed from storage for extraction or analysis.

5.4 Completing COC/Analytical Request Forms

COC form/analytical request form completion procedures are crucial in properly transferring the custody and responsibility of samples from field personnel to the laboratory. This form is important for accurately and concisely requesting analyses for each sample; it is essentially a release order from the analysis subcontract.

Attachment 2 is an example of a generic COC/analytical request form that may be used by **field personnel**. Multiple copies may be tailored to each project so that much of the information described below need not be handwritten each time. Attachment 3 is an example of a completed site-specific COC/analytical request form, with box numbers identified and discussed in text below.

COC forms tailored to each CTO can be drafted and printed onto multi-ply forms. This eliminates the need to rewrite the analytical methods column headers each time. It also eliminates the need to write the project manager, name, and number; QC Level; TAT; and the same general comments each time.

Complete one COC form per cooler. Whenever possible, place all VOC analyte vials into one cooler in order to reduce the number of trip blanks. Complete all sections and be sure to sign and date the COC form. One copy of the COC form must remain with the field personnel.

Box 2 **Bill To:** List the name and address of the person/company to bill only if it is not in the subcontract with the laboratory.

Box 3 **Sample Disposal Instructions:** These instructions will be stated in the Master Service Agreement or each CTO statement of work with each laboratory.

Shipment Method: State the method of shipment (e.g., hand carry or air courier via FedEx or DHL).

Comments: This area shall be used by the field team to communicate observations, potential hazards, or limitations that may have occurred in the field or additional information regarding analysis (e.g., a specific metals list, samples expected to contain high analyte concentrations).

Box 4 **Cooler No.:** This will be written on the inside or outside of the cooler and shall be included on the COC. Some laboratories attach this number to the trip blank identification, which helps track samples for VOC analysis. If a number is not on the cooler, field personnel shall assign a number, write it on the cooler, and write it on the COC.

QC Level: Enter the reporting quality control (QC) requirements (e.g., Full Data Package, Summary Data Package).

Turnaround time (TAT): TAT will be determined by a sample delivery group (SDG), which may be formed over a 14-day period, not to exceed 20 samples. Once the SDG has been completed, standard TAT is 21 calendar days from receipt of the last sample in the SDG. Entering NORMAL or STANDARD in this field will be acceptable. If quicker TAT is required, it shall be in the subcontract with the laboratory and reiterated on each COC to remind the laboratory.

Box 5 **Type of Containers:** Write the type of container used (e.g., 1-liter glass amber, for a given parameter in that column).

Preservatives: Field personnel must indicate on the COC the correct preservative used for the analysis requested. Indicate the pH of the sample (if tested) in case there are buffering conditions found in the sample matrix.

Box 6 **Sample Identification (ID) Number:** This is typically a five-character alphanumeric identifier used by the contractor to identify samples. The use of this identifier is important since the laboratories are restricted to the number of characters they are able to use. Sample numbering shall be in accordance with the project-specific sampling and analysis plan.

Description (Sample ID): This name will be determined by the location and description of the sample, as described in the project-specific sampling and analysis plan. This sample identification should not be submitted to the laboratory, but should be left blank. If a computer COC version is used, the sample identification can be input, but printed with this block black. A cross-referenced list of the COC Sample Number and sample identification must be maintained separately.

Date Collected: Record the collection date in order to track the holding time of the sample. Note: For trip blanks, record the date it was placed in company with samples.

Time Collected: When collecting samples, record the time the sample is first collected. Use of the 24-hour military clock will avoid a.m. or p.m. designations (e.g., 1815 instead of 6:15 p.m.). Record local time; the laboratory is responsible for calculating holding times to local time.

Lab ID: This is for laboratory use only.

Box 7 **Matrix/QC:** Identify the matrix (e.g., water, soil, air, tissue, fresh water sediment, marine sediment, or product). If a sample is expected to contain high analyte concentrations (e.g., a tank bottom sludge or distinct product layer), notify the laboratory in the comment section. Mark an "X" for the sample(s) that have extra volume for laboratory QC matrix spike/matrix spike duplicate (MS/MSD) purposes. The sample provided for MS/MSD purposes is usually a field duplicate.

Box 8 **Analytical Parameters:** Enter the parameter by descriptor and the method number desired (e.g., BTEX 8260B, PAHs 8270C, etc.). Whenever practicable, list the parameters as they appear in the laboratory subcontract to maintain consistency and avoid confusion.

If the COC does not have a specific box for number of sample containers, use the boxes below the analytical parameter, to indicate the number of containers collected for each parameter.

Box 9 **Sampler's Signature:** The person who collected samples must sign here.

Relinquished By: The person who turned over the custody of the samples to a second party other than an express mail carrier, such as FedEx or DHL, must sign and date here.

Received By: Typically, a representative of the receiving laboratory signs and dates here. Or, a field crew member who delivered the samples in person from the field to the laboratory might sign here. A courier, such as FedEx or DHL, does not sign here because they do not open the coolers. It must also be used by the prime contracting laboratory when samples are to be sent to a subcontractor.

Relinquished By: In the case of subcontracting, the primary laboratory will sign and date the Relinquished By space and fill out an additional COC to accompany the samples being subcontracted.

Received By (Laboratory): This space is for the final destination (e.g., at a subcontracted laboratory). A representative of the final destination (e.g., subcontracted laboratory) must sign and date here.

Box 10 **Lab No. and Questions:** This box is to be filled in by the laboratory only.

Box 11 **Control Number:** This number is the "COC" followed by the first contractor identification number in that cooler, or contained on that COC. This control number must be unique (i.e., never used twice). Record the date the COC is completed. It should be the same date the samples are collected.

Box 12 **Total # of Containers:** Sum the number of containers in that row.

Box 13 **Totals:** Sum the number of containers in each column. Because COC forms contain different formats depending on who produced the form, not all of the information listed in items 1 to 13 may be recorded; however, as much of this information as possible shall be included.

6.0 Quality Control and Assurance

6.1 Recordkeeping, sample labeling, and chain-of-custody activities must incorporate quality control measures to ensure accuracy and completeness.

6.2 Deviations from this procedure or the project-specific CTO work plan shall be documented in field records. Significant changes shall be approved by the **Program Quality Manager**.

7.0 Records, Data Analysis, Calculations

7.1 The COC/analytical request form shall be faxed approximately daily to the **Laboratory Coordinator** for verification of accuracy. Following the completion of sampling activities, the sample logbook and COC forms will be transmitted to the **Project Manager** for storage in project files. The **data validators** shall receive a copy also. The original COC/analytical request form shall be submitted by the **laboratory** along with the data delivered. Any changes to the analytical requests that are required shall be made in writing to the laboratory. A copy of this written change shall be sent to the data validators and placed in the project files. The reason for the change shall be included in the project files so that recurring problems can be easily identified.

7.2 Deviations from this procedure or the project-specific sampling and analysis plan shall be documented in the records. Significant changes shall be approved by the **Program Quality Manager**.

8.0 Attachments or References

8.1 Attachment 1 – Chain-of-Custody Seal

8.2 Attachment 2 – Generic Chain-of-Custody/Analytical Request Form

8.3 Attachment 3 – Sample Completed Chain-of-Custody

8.4 Attachment 4 – Sample Out-of-Control Form

8.5 Environmental Protection Agency, United States (EPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA.* Interim Final. EPA/540/G-89/004. Office of Emergency and Remedial Response. October.

8.6 EPA. 1992. *RCRA Groundwater Monitoring Draft Technical Guidance*. EPA/530/R-93/001. Office of Solid Waste. November.

8.7 EPA. 1997. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846. 3rd ed., Final Update IIIA. Office of Solid Waste.

8.8 Water Resources Control Board, State of California. 1988. *Technical Guidance Manual for Solid Waste Water Quality Assessment Test (SWAT) Proposals and Reports*. August.

8.9 Procedure 3-02, *Logbooks.*

Author	Reviewer	Revisions (Technical or Editorial)
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Attachment 1
Chain-of-Custody Seal

CHAIN-OF-CUSTODY SEAL

[LABORATORY]	SAMPLE NO.	DATE	SEAL BROKEN BY
	SIGNATURE		DATE
	PRINT NAME AND TITLE *(Inspector, Analyst or Technician*		

AECOM

Attachment 2
Generic Chain-of-Custody / Analytical Request Form

M901376

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name:	Project Location:	Analysis Requested
Project Number:	Field Logbook No.:	
Sampler: (Print Name) /Affiliation: Signature:	Chain of Custody Tape No.:	
	Send Results/Report to:	

Field Sample No./ Identification	Date	Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	Field Filtered							Lab I.D.	Remarks

Relinquished by: (Print Name) Signature:	Date: Time:	Received by: (Print Name) Signature:	Date: Time:	Analytical Laboratory (Destination):
Relinquished by: (Print Name) Signature:	Date: Time:	Received by: (Print Name) Signature:	Date: Time:	
Relinquished by: (Print Name) Signature:	Date: Time:	Received by: (Print Name) Signature:	Date: Time:	Serial No.

Attachment 3
Sample Completed Chain-of-Custody

Chain-of-Custody

(11) Control Number: 96H0HC205

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(4)		(2)		(3)	
CTO/DO Manager:	Joe Smith	Bill To:	CLEAN/RAC Contractor	Sample Disposal	by lab
CTO/DO Name:	Former Navy Landfill	Company:	company name	Shipment Method:	Express Courier
CTO/DO Number:	CTO 0250	Address:	Oahu, Hawaii	Comments:	PACDIV Level D, Measure Cooler Temperature at Lab
Deliver results to the address above or as stated in contract					

(4) Cooler No: 413

QC Level: PACDIV Level D TAT: Normal - per contract

(6) Sample Data: Sample ID (EPA ID)	Sample ID (Navy IRP Use Only)	Date Collected	Time Collected	Lab ID	(7) Matrix/QC: Soil	Water	Other (drum, sludge, etc.)	Field Duplicate (MS/MSD)	(8) TPH 8015B	CLP VOAs	CLP SVOAs	CLP Pesticides	CLP Metals	EPA 8080 (PCBs only)	EPA 8240	EPA 8270	Total Lead by EPA 6010					Extra Volume MS/MSD	HOLD	(12) Total # of Containers
(5) container # (water):									1	2	2	1	2	1								2		
Preservatives:									HCL	HCL			HNO3											
HC205		9/6/96	9:35		X				X	X	X	X	X	X										1
HC206		9/6/96	9:50		X				X	X	X	X	X	X										1
HC207		9/6/96	10:15		X				X	X	X	X	X	X										1
HC208		9/6/96	10:25		X				X	X	X	X	X	X										1
HC209		9/6/96	10:45		X				X	X	X	X	X	X										1
HC210		9/6/96	10:55			X		X		X														2
HC211		9/6/96	12:50			X			X	X	X	X	X	X										9
					(13)			TOTALS:	6	9	7	6	7	6										16

(9) Samplers Signature	Date	Time
Relinquished By:	Date	Time
Received By:	Date	Time
Relinquished By:	Date	Time
Received By (LAB):	Date	Time

(10) For Lab Use

Lab No.:
Does COC match samples: Y or N
Broken container: Y or N
Received within holding time: Y or N
COC seal intact: Y or N
Any other problems: Y or N
If problems, Client contacted: Y or N
Date contacted: ___/___/___
Temperature (°C):

Original (white), Lab Copy (yellow), Field Copy (pink)

Attachment 4
Sample Out-of-Control Form

OUT OF CONTROL FORM	Status	Date	Initial
	Noted OOC		
	Submit for CA*		
	Resubmit for CA*		
	Completed		

Date Recognized:		By:	
Dated Occurred:		Matrix	
Parameter (Test Code):		Method:	
Analyst:		Supervisor:	
1. Type of Event (Check all that apply)		2. Corrective Action (CA)* (Check all that apply)	
	Calibration Corr. Coefficient <0.995		Repeat calibration
	%RSD>20%		Made new standards
	Blank >MDL		Reran analysis
	Does not meet criteria:		Sample(s) redigested and rerun
	Spike		Sample(s) reextracted and rerun
	Duplicate		Recalculated
	LCS		Cleaned system
	Calibration Verification		Ran standard additions
	Standard Additions		Notified
	MS/MSD		Other (please explain)
	BS/BSD		
	Surrogate Recovery		
	Calculations Error		
	Holding Times Missed		
	Other (Please explain	Comments:	

Samples Affected (List by Accession AND Sample No.)

3. Results of Corrective Action	
	Return to Control (indicated with)
	Corrective Actions Not Successful - DATA IS TO BE FLAGGED with ______________.

Analyst:	Date:
Supervisor:	Date:
QA Department:	Date:

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Sample Handling, Storage, and Shipping

Procedure 3-04

1.0 Purpose and Scope

1.1 This standard operating procedure describes the actions to be used by personnel engaged in handling, storing, and transporting samples. The objective is to obtain samples of actual conditions with as little alteration as possible.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 Avoid lifting heavy coolers with back muscles; instead, use leg muscles or dollies.

2.2 Wear proper gloves, such as blue nitrile and latex, as defined in the project-specific health and safety plan, when handling sample containers to avoid contacting any materials that may have spilled out of the sample containers.

3.0 Terms and Definitions

None.

4.0 Training and Qualifications

4.1 The **Project Manager** and the **Laboratory Project Manager** are responsible for identifying instances of non-compliance with this procedure and ensuring that future sample transport activities comply with this procedure.

4.2 The **Site Supervisor** is responsible for ensuring that all samples are shipped according to this procedure.

4.3 **Field personnel** are responsible for the implementation of this procedure.

4.4 The **Program Quality Manager** is responsible for ensuring that sample handling, storage, and transport activities conducted during all CTOs comply with this procedure.

4.5 All **field personnel** are responsible for the implementation of this procedure.

5.0 Procedure

5.1 Handling and Storage

Immediately following collection, label all samples according to Procedure 3-03, *Recordkeeping, Sample Labeling, and Chain-of-Custody*. The lids of the containers shall not be sealed with duct tape, but may be covered with custody seals or placed directly into self-sealing bags. Place the sample containers in an insulated cooler with frozen gel packs (e.g., "blue ice") or ice in double, sealed self-sealing bags. Samples should occupy the lower portion of the cooler, while the ice should occupy the upper portion. Place an absorbent material (e.g., proper absorbent cloth material) on the bottom of the cooler to contain liquids in case of spillage. Fill all empty space between sample containers with Styrofoam® "peanuts" or other appropriate material. Prior to shipping, wrap glass sample containers on the sides, tops, and bottoms with bubble wrap or other appropriate padding and/or surround them in Styrofoam to prevent breakage during transport. Pack all glass containers for water samples in an upright position, never stacked or on their sides. Prior to shipment, replace the ice or cold packs in the coolers so that samples will be maintained as close to 4 degrees Celsius (°C) as possible from the time of collection through transport to the analytical laboratory. Ship samples within 24 hours or on a schedule allowing the laboratory to meet holding times for analyses. The procedures for maintaining sample temperatures at 4°C pertain to all field samples.

5.2 Shipping

Follow all appropriate U.S. Department of Transportation regulations (e.g., 49 Code of Federal Regulations [CFR], Parts 171-179) for shipment of air, soil, water, and other samples. Elements of these procedures are summarized below.

5.2.1 Hazardous Materials Shipment

Field personnel must state whether any sample is suspected to be a hazardous material. A sample should be assumed hazardous unless enough evidence exists to indicate it is non-hazardous. If not suspected to be hazardous, shipments may be made as described in the Section 5.2.2 for non-hazardous materials. If hazardous, follow the procedures summarized below.

Any substance or material that is capable of posing an unreasonable risk to life, health, or property when transported is classified as hazardous. Perform hazardous materials identification by checking the list of dangerous goods for that particular mode of transportation. If not on that list, materials can be classified by checking the Hazardous Materials Table (49 CFR 172.102 including Appendix A) or by determining if the material meets the definition of any hazard class or division (49 CFR Part 173), as listed in Attachment 2.

All **persons shipping hazardous materials** must be properly trained in the appropriate regulations, as required by HM-126F, Training for Safe Transportation of Hazardous Materials (49 CFR HM-126F Subpart H). The training covers loading, unloading, handling, storing, and transporting of hazardous materials, as well as emergency preparedness in the case of accidents. **Carriers**, such as commercial couriers, must also be trained. Modes of shipment include air, highway, rail, and water.

When shipping hazardous materials, including bulk chemicals or samples suspected of being hazardous, the proper shipping papers (49 CFR 172 Subpart C), package marking (49 CFR 172 Subpart D), labeling (49 CFR 172 Subpart E), placarding (49 CFR 172 Subpart F, generally for carriers), and packaging must be used. Attachment 1 shows an example of proper package markings. Refer to a copy of 49 CFR each time hazardous materials/potentially hazardous samples are shipped.

According to Section 2.7 of the International Air Transport Association Dangerous Goods Regulations publication, very small quantities of certain dangerous goods may be transported without certain marking and documentation requirements as described in 49 CFR Part 172; however, other labeling and packing requirements must still be followed. Attachment 2 shows the volume or weight for different classes of substances. A "Dangerous Goods in Excepted Quantities" label must be completed and attached to the associated shipping cooler (Attachment 3). Certain dangerous goods are not allowed on certain airlines in any quantity.

As stated in item 4 of Attachment 4, the Hazardous Materials Regulations do not apply to hydrochloric acid (HCl), nitric acid (HNO_3), sulfuric acid (H_2SO_4), and sodium hydroxide (NaOH) added to water samples if their pH or percentage by weight criteria is met. These samples may be shipped as non-hazardous materials as discussed below.

5.2.2 Non-Hazardous Materials Shipment

If the samples are suspected to be non-hazardous based on previous site sample results, field screening results, or visual observations, if applicable, then samples may be shipped as non-hazardous.

When a cooler is ready for shipment to the laboratory, place two copies of the chain-of-custody form inside a self-sealing bag and tape it to the inside of the insulated cooler. Then, seal the cooler with waterproof tape and label it with "Fragile," "This-End-Up" (or directional arrows pointing up), or other appropriate notices. Place chain-of-custody seals on the coolers as discussed in Procedure 3-03, *Recordkeeping, Sample Labeling, and Chain-of-Custody*.

5.2.3 Shipments from Outside the Continental United States

Shipment of sample coolers to the United States from locations outside the continental United States is controlled by the U.S. Department of Agriculture (USDA) and is subject to their inspection and regulation. A "USDA Soil Import Permit" is required to prove that the receiving analytical laboratory is certified by the USDA to receive and properly dispose of soil. In addition, all sample coolers must be inspected by a **USDA representative**, affixed with a label indicating that the coolers contain environmental samples, and accompanied by shipping forms stamped by the **USDA inspector** prior to shipment.

In addition, the U.S. Customs Service must clear samples shipped from U.S. territorial possessions or foreign countries upon entry into the United States. As long as the commercial invoice is properly completed (see below), shipments typically pass through U.S. Customs Service without the need to open coolers for inspection.

Completion and use of proper paperwork will, in most cases, minimize or eliminate the need for the USDA and U.S. Customs Service to inspect the contents. Attachment 5 shows an example of how paperwork may be placed on the outside of coolers for non-hazardous materials. For hazardous materials, refer to Section 5.2.1.

In summary, tape the paperwork listed below to the outside of the coolers to accompany sample shipments. If a shipment is made up of multiple pieces (e.g., more than one cooler), the paperwork need only be attached to one cooler, provided that the **courier** agrees. All other coolers in the shipment need only to be taped and have the address and chain-of-custody seals affixed.

1. **Courier Shipping Form & Commercial Invoice:** See Attachment 6 and Attachment 7 for examples of the information to be included on the commercial invoices for soil and water, respectively. Place the courier shipping form and commercial invoice inside a clear, plastic, adhesive-backed pouch that adheres to the package (typically supplied by the courier) and place it on the cooler lid as shown in Attachment 5.

2. **Soil Import Permit (soil only):** See Attachment 8 and Attachment 9 for examples of the soil import permit and soil samples restricted entry labels, respectively. The **laboratory** shall supply these documents prior to mobilization. The USDA often stops shipments of soil without these documents. Staple together the 2-inch × 2-inch USDA label (described below) and soil import permit, and place them inside a clear plastic pouch. The **courier** typically supplies the clear, plastic, adhesive-backed pouches that adhere to the package.

   Placing one restricted entry label as shown in Attachment 5 (covered with clear packing tape) and one stapled to the actual permit is suggested.

   The USDA does not control water samples, so the requirements for soil listed above do not apply.

3. **Chain-of-Custody Seals:** The **laboratory** should supply the seals. **CTO personnel** must sign and date these. At least two seals should be placed in such a manner that they stick to both the cooler lid and body. Placing the seals over the tape (as shown in Attachment 5), then covering it with clear packing tape is suggested. This prevents the seal from coming loose and enables detection of tampering.

4. **Address Label:** Affix a label stating the destination (laboratory address) to each cooler.

5. **Special Requirements for Hazardous Materials:** See Section 5.2.1.

Upon receipt of sample coolers at the laboratory, the **sample custodian** shall inspect the sample containers as discussed in Procedure 3-03, *Recordkeeping, Sample Labeling, and Chain-of-Custody*. The samples shall then be immediately extracted and/or analyzed, or stored in a refrigerated storage area until they are removed for extraction and/or analysis. Whenever the samples are not being extracted or analyzed, they shall be returned to refrigerated storage.

6.0 Quality Control and Assurance

6.1 Sample handling, storage, and shipping must incorporate quality control measures to ensure conformance to these and the project requirements.

7.0 Records, Data Analysis, Calculations

7.1 Maintain records as required by implementing these procedures.

7.2 Deviations from this procedure or the project-specific sampling and analysis plan shall be documented in field records. Significant changes shall be approved by the **Program Quality Manager**.

8.0 Attachments or Reference

8.1 Attachment 1 – Example Hazardous Material Package Marking

8.2 Attachment 2 – Packing Groups

8.3 Attachment 3 – Label for Dangerous Goods in Excepted Quantities

8.4 Attachment 4 – SW-846 Preservative Exception

8.5 Attachment 5 – Non-Hazardous Material Cooler Marking Figure for Shipment from Outside the Continental United States

8.6 Attachment 6 – Commercial Invoice – Soil

8.7 Attachment 7 – Commercial Invoice – Water

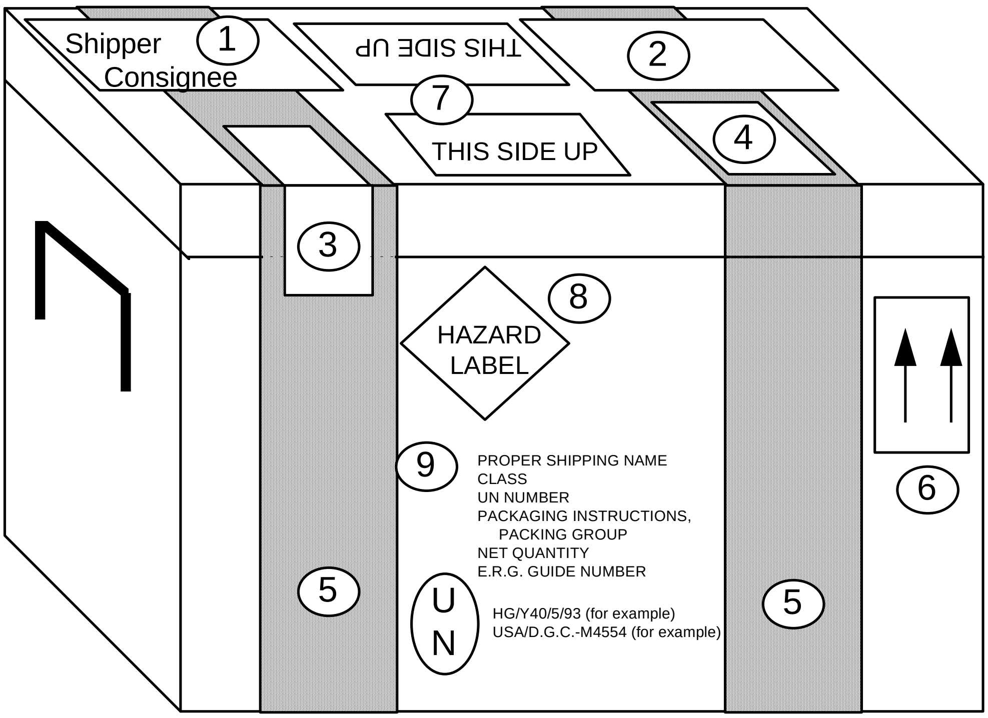
8.8 Attachment 8 – Soil Import Permit

8.9 Attachment 9 – Soil Samples Restricted Entry Labels

8.10 Procedure 3-03, *Recordkeeping, Sample Labeling, and Chain-of-Custody*.

Author	Reviewer	Revisions (Technical or Editorial)
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue
Amanda Martin Environmental Scientist	Mark Kauffman Program Manger	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW p rojects (April 2017)

Attachment 1
Example Hazardous Material Package Marking



1	**AIR BILL/COMMERCIAL INVOICE**	6	**DIRECTION ARROWS STICKER - TWO REQUIRED**
2	**USDA PERMIT (Letter to Laboratory from USDA)**	7	**THIS SIDE UP STICKERS**
3	**CUSTODY SEAL**	8	**HAZARD LABEL**
4	**USDA 2" X 2" SOIL IMPORT PERMIT**	9	**HAZARDOUS MATERIAL INFORMATION**
5	**WATERPROOF STRAPPING TAPE**	10	**PACKAGE SPECIFICATIONS**

Attachment 2
Packing Groups

PACKING GROUP OF THE SUBSTANCE	PACKING GROUP 1		PACKING GROUP II		PACKING GROUP III	
CLASS or DIVISION of PRIMARY or SUBSIDIARY RISK	Packagings		Packagings		Packagings	
	Inner	Outer	Inner	Outer	Inner	Outer
1: Explosives	---------------------------- Forbidden (Note A) ----------------------------------					
2.1: Flammable Gas	---------------------------- Forbidden (Note B) ----------------------------------					
2.2: Non-Flammable, non-toxic gas	---------------------------- See Notes A and B ----------------------------------					
2.3: Toxic gas	---------------------------- Forbidden (Note A) ----------------------------------					
3. Flammable liquid	30 mL	300 mL	30 mL	500 mL	30 mL	1 L
4.1 Self-reactive substances	Forbidden		Forbidden		Forbidden	
4.1: Other flammable solids	Forbidden		30 g	500 g	30 g	1 kg
4.2: Pyrophoric substances	Forbidden		Not Applicable		Not Applicable	
4.2 Spontaneously combustible substances	Not Applicable		30 g	500 g	30 g	1 kg
4.3: Water reactive substances	Forbidden		30 g or 30 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L
5.1: Oxidizers	Forbidden		30 g or 30 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L
5.2: Organic peroxides (Note C)	See Note A		30 g or 30 mL	500 g or 250 mL	Not Applicable	
6.1: Poisons - Inhalation toxicity	Forbidden		1 g or 1 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L
6.1: Poisons - oral toxicity	1 g or 1 mL	300 g or 300 mL	1 g or 1 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L
6.1: Poisons - dermal toxicity	1 g or 1 mL	300 g or 300 mL	1 g or 1 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L
6.2: Infectious substances	---------------------------- Forbidden (Note A) ----------------------------------					
7: Radioactive material (Note D)	---------------------------- Forbidden (Note A) ----------------------------------					
8: Corrosive materials	Forbidden		30 g or 30 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L
9: Magnetized materials	---------------------------- Forbidden (Note A) ----------------------------------					
9: Other miscellaneous materials (Note E)	Forbidden		30 g or 30 mL	500 g or 500 mL	30 g or 30 mL	1 kg or 1 L

Note A: *Packing groups are not used for this class or division.*
Note B: *For inner packagings, the quantity contained in receptacle with a water capacity of 30 mL. For outer packagings, the sum of the water capacities of all the inner packagings contained must not exceed 1 L.*
Note C: *Applies only to Organic Peroxides when contained in a chemical kit, first aid kit or polyester resin kit.*
Note D: *See 6.1.4.1, 6.1.4.2, and 6.2.1.1 through 6.2.1.7, radioactive material in excepted packages.*
Note E: *For substances in Class 9 for which no packing group is indicated in the List of Dangerous Goods, Packing Group II quantities must be used.*

Attachment 3
Dangerous Goods in Excepted Quantities

DANGEROUS GOODS IN EXCEPTED QUANTITIES

This package contains dangerous goods in excepted small quantities and is in all respects in compliance with the applicable international and national government regulations and the IATA Dangerous Goods Regulations.

____
Signature of Shipper

_______________________ _____________________
Title Date

____

____
Name and address of Shipper

This package contains substance(s) in Class(es)
(check applicable box(es))

Class:	2	3	4	5	6	8	9
	☐	☐	☐	☐	☐	☐	☐

and the applicable UN Numbers are:

Attachment 4
SW-846 Preservative Exception

Measurement	Vol. Req. (mL)	Container[2]	Preservative[3,4]	Holding Time[5]
MBAS	250	P, G	Cool, 4ºC	48 Hours
NTA	50	P, G	Cool, 4ºC	24 Hours

1. More specific instructions for preservation and sampling are found with each procedure as detailed in this manual. A general discussion on sampling water and industrial wastewater may be found in ASTM, Part 31, p. 72-82 (1976) Method D-3370.

2. Plastic (P) or Glass (G). For metals, polyethylene with a polypropylene cap (no liner) is preferred.

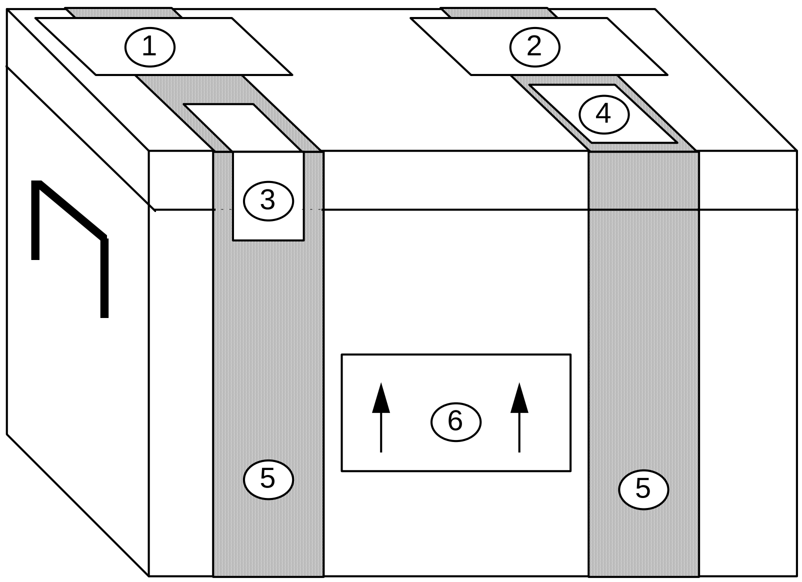
3. Sample preservation should be performed immediately upon sample collection. For composite samples each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then samples may be preserved by maintaining at 4ºC until compositing and sample splitting is completed.

4. When any sample is to be shipped by common carrier or sent through the United States Mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. for the preservation requirements of Table 1, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials regulations do not apply to the following materials: Hydrochloric acid (HCl) in water solutions at concentration of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HNO_3) in water solutions at concentrations of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); Sodium hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

5. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still considered valid. Samples may be held for longer periods only if the permittee, or monitoring laboratory, has data on file to show that the specific types of sample under study are stable for the longer time, and has received a variance from the Regional Administrator. Some samples may not be stable for the maximum time period given in the table. A permittee, or monitoring laboratory, is obligated to hold the sample for a shorter time if knowledge exists to show this is necessary to maintain sample stability.

6. Should only be used in the presence of residual chlorine.

Attachment 5
Non-Hazardous Material Cooler Marking Figure for Shipment from Outside the Continental United States



1. AIR BILL/COMMERCIAL INVOICE
2. USDA PERMIT (Letter to Laboratory from USDA)
3. CUSTODY SEAL
4. USDA 2" X 2" SOIL IMPORT PERMIT
5. WATERPROOF STRAPPING TAPE
6. DIRECTION ARROWS STICKER - TWO REQUIRED

Attachment 6
Commercial Invoice – Soil

DATE OF EXPORTATION 1/1/94	EXPORT REFERENCES (i.e., order no., invoice no., etc.) <CIO #>
SHIPPER/EXPORTER (complete name and address) Joe Smith Ogden c/o <hotel name> <hotel address>	CONSIGNEE Sample Receipt <Lab Name> <Lab Address>
COUNTRY OF EXPORT Guam, USA	IMPORTER - IF OTHER THAN CONSIGNEE
COUNTRY OF ORIGIN OF GOODS Guam, USA	
COUNTRY OF ULTIMATE DESTINATION USA	

INTERNATIONAL AIR WAYBILL NO.

(NOTE: All shipments must be accompanied by a Federal Express International Air Waybill)

MARKS/NOS	NO. OF PKGS	TYPE OF PACKAGING	FULL DESCRIPTION OF GOODS	QTY	UNIT OF MEASURE	WEIGHT	UNIT VALUE	TOTAL VALUE
	3	coolers	Soil samples for laboratory analysis only				$1.00	$3.00
	TOTAL NO. OF PKGS.					TOTAL WEIGHT		TOTAL INVOICE VALUE
	3							$3.00

Check one
- ☐ F.O.B.
- ☐ C&F
- ☐ C.I.F.

THESE COMMODITIES ARE LICENSED FOR THE ULTIMATE DESTINATION SHOWN.

DIVERSION CONTRARY TO UNITED STATES LAW IS PROHIBITED.

I DECLARE ALL THE INFORMATION CONTAINED IN THIS INVOICE TO BE TRUE AND CORRECT

SIGNATURE OF SHIPPER/EXPORTER (Type name and title and sign)

Joe Smith, Ogden	Joe Smith	1/1/94
Name/Title	Signature	Date

Attachment 7
Commercial Invoice – Water

DATE OF EXPORTATION 1/1/94	EXPORT REFERENCES (i.e., order no., invoice no., etc.) <CJO #>
SHIPPER/EXPORTER (complete name and address) Joe Smith Ogden c/o <hotel name> <hotel address>	CONSIGNEE Sample Receipt <Lab Name> <Lab Address>
COUNTRY OF EXPORT Guam, USA	IMPORTER - IF OTHER THAN CONSIGNEE
COUNTRY OF ORIGIN OF GOODS Guam, USA	
COUNTRY OF ULTIMATE DESTINATION USA	

INTERNATIONAL AIR WAYBILL NO. (NOTE: All shipments must be accompanied by a Federal Express International Air Waybill)

MARKS/NOS	NO. OF PKGS	TYPE OF PACKAGING	FULL DESCRIPTION OF GOODS	QTY	UNIT OF MEASURE	WEIGHT	UNIT VALUE	TOTAL VALUE
	3	coolers	Water samples for laboratory analysis only				$1.00	$3.00
	TOTAL NO. OF PKGS.					TOTAL WEIGHT		TOTAL INVOICE VALUE
	3							$3.00

Check one
- ☐ F.O.B.
- ☐ C&F
- ☐ C.I.F.

THESE COMMODITIES ARE LICENSED FOR THE ULTIMATE DESTINATION SHOWN.

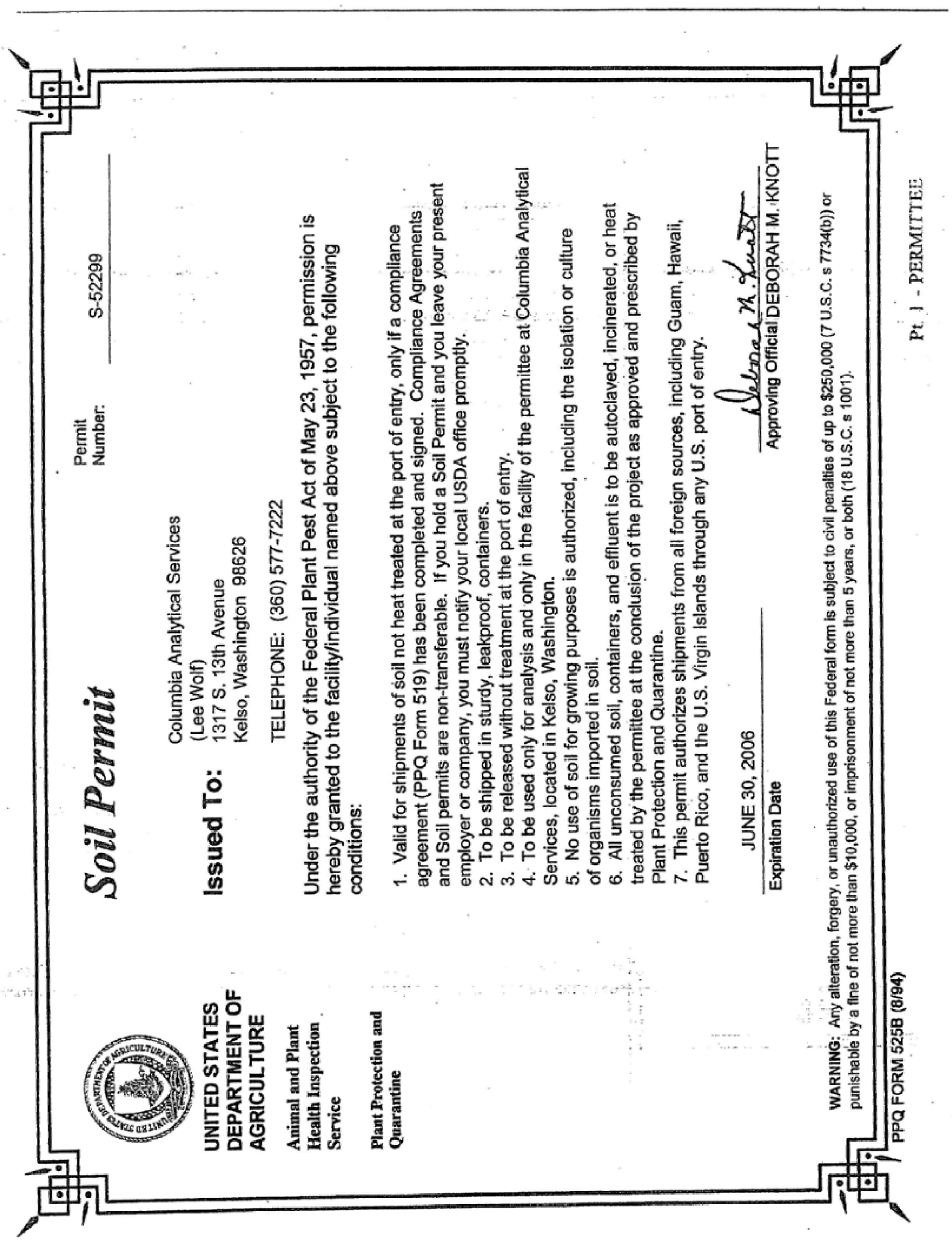
DIVERSION CONTRARY TO UNITED STATES LAW IS PROHIBITED.

I DECLARE ALL THE INFORMATION CONTAINED IN THIS INVOICE TO BE TRUE AND CORRECT

SIGNATURE OF SHIPPER/EXPORTER (Type name and title and sign)

Joe Smith, Ogden ____ Joe Smith ____ 1/1/94 ____

Attachment 8
Soil Import Permit



Soil Permit

Permit Number: S-52299

UNITED STATES DEPARTMENT OF AGRICULTURE

Animal and Plant Health Inspection Service

Plant Protection and Quarantine

Issued To: Columbia Analytical Services
(Lee Wolf)
1317 S. 13th Avenue
Kelso, Washington 98626

TELEPHONE: (360) 577-7222

Under the authority of the Federal Plant Pest Act of May 23, 1957, permission is hereby granted to the facility/individual named above subject to the following conditions:

1. Valid for shipments of soil not heat treated at the port of entry, only if a compliance agreement (PPQ Form 519) has been completed and signed. Compliance Agreements and Soil permits are non-transferable. If you hold a Soil Permit and you leave your present employer or company, you must notify your local USDA office promptly.
2. To be shipped in sturdy, leakproof, containers.
3. To be released without treatment at the port of entry.
4. To be used only for analysis and only in the facility of the permittee at Columbia Analytical Services, located in Kelso, Washington.
5. No use of soil for growing purposes is authorized, including the isolation or culture of organisms imported in soil.
6. All unconsumed soil, containers, and effluent is to be autoclaved, incinerated, or heat treated by the permittee at the conclusion of the project as approved and prescribed by Plant Protection and Quarantine.
7. This permit authorizes shipments from all foreign sources, including Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands through any U.S. port of entry.

JUNE 30, 2006
Expiration Date

Approving Official DEBORAH M. KNOTT

WARNING: Any alteration, forgery, or unauthorized use of this Federal form is subject to civil penalties of up to $250,000 (7 U.S.C. s 7734(b)) or punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. s 1001).

PPQ FORM 525B (8/94)

Pt. 1 - PERMITTEE

Attachment 9
Soil Samples Restricted Entry Labels

U.S. DEPARTMENT OF AGRICULTURE

ANIMAL AND PLANT HEALTH INSPECTION SERVICE

PLANT PROTECTION AND QUARANTINE

HYATTSVILLE, MARYLAND 20782

SOIL SAMPLES

RESTRICTED ENTRY

The material contained in this package is imported under authority of the Federal Plant Pest Act of May 23, 1957.

For release without treatment if addressee is currently listed as approved by Plant Protection and Quarantine.

PPQ FORM 550 *Edition of 12/77 may be used*

(JAN 83)

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Investigation-Derived Waste Management

Procedure 3-05

1.0 Purpose and Scope

This standard operating procedure (SOP) describes activities and responsibilities of the United States Army Corp of Engineers (USACE), New England District, with regard to management of investigation-derived waste (IDW).
The purpose of this procedure is to provide guidance for the minimization, handling, labelling, temporary storage, inventory, classification, and disposal of IDW generated under the ER Program. This procedure will also apply to personal protective equipment (PPE), sampling equipment, decontamination fluids, non-IDW trash, non-indigenous IDW, and hazardous waste generated during implementation of removal or remedial actions. The information presented will be used to prepare and implement work plans (WPs) for IDW-related field activities. The results from implementation of WPs will then be used to develop and implement final IDW disposal plans.

If there are procedures whether it be from AECOM, state and/or federal that are not addressed in this SOP and are applicable to IDW then those procedures may be added as an appendix to the project specific SAP.

This procedure shall serve as management-approved professional guidance and is consistent with protocol in the Uniform Federal Policy-Quality Assurance Project Plan (DoD 2005). As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgment during unforeseen circumstances. Deviations from this procedure while planning or executing planned activities must be approved by both the Project Manager and the Quality Assurance (QA) Manager or Technical Director, and documented.

This procedure was developed to serve as management-approved professional guidance for the management of IDW generated. It focuses on the requirements for minimizing, segregating, handling, labeling, storing, and inventorying IDW in the field. Certain drum inventory requirements related to the screening, sampling, classification, and disposal of IDW are also noted in this procedure.

2.0 Safety

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project Accident Prevention Plan (APP). In the absence of a APP, work will be conducted according to the WP and/or direction from the **Site Safety and Health Officer (SSHO)**.

All **Field Personnel** responsible for IDW management must adhere to the APP and must wear the PPE specified in the site-specific APP. Generally, this includes, at a minimum, steel-toed boots or steel-toed rubber boots, safety glasses, American National Standards Institute-standard hard hats, and hearing protection (if heavy equipment is in operation). If safe alternatives are not achievable, discontinue site activities immediately.

3.0 Terms and Definitions

None.

4.0 Training and Qualifications

4.1 The **Project Manager** is responsible for ensuring that IDW management activities comply with this procedure. The **Project Manager** is responsible for ensuring that all personnel involved in IDW management shall have the appropriate education, experience, and training to perform their assigned tasks.

4.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

4.3 The **Site Supervisor** is responsible for ensuring that all IDW is managed according to this procedure.

4.4 All **Field Personnel** are responsible for the implementation of this procedure.

5.0 Equipment and Supplies

The equipment and supplies required for implementation of this SOP include the following:

- Containers for waste (e.g., [U.S. Department of Transportation] DOT approved 55-gallon open and closed top drums) and material to cover waste to protect from weather (e.g., plastic covering);
- Hazardous /non-hazardous waste drum labels (weatherproof);
- Permanent marking pens;
- Inventory forms for project file;
- Plastic garbage bags, zip lock storage bags, roll of plastic sheeting; and
- Steel-toed boots, chemical resistant gloves, coveralls, safety glasses, and any other PPE required in the HASP.

6.0 Procedure

The following procedures are used to handle the IDW.

6.1 Drum Handling

6.1.1 IDW shall be containerized using DOT approved drums. The drums shall be made of steel or plastic, have a 55-gallon capacity, be completely painted or opaque, and have removable lids (i.e., United Nations Code 1A2 or 1H2). Typically 55-gallon drums are used, however small drums may be used depending on the amount of waste generated. New steel drums are preferred over recycled drums.

6.1.2 Recycled drums should not be used for hazardous waste, PCBs or other regulated shipments. For short-term storage of liquid IDW prior to discharge, double-walled bulk steel or plastic storage tanks may be used. For this scenario, consider the scheduling and cost-effectiveness of this type of bulk storage, treatment, and discharge system versus longer-term drum storage.

6.1.3 For long-term IDW storage at other project locations, the DOT approved drums with removable lids are recommended. Verify the integrity of the foam or rubber sealing ring located on the underside of some drum lids prior to sealing drums containing IDW liquids.

6.1.4 If the ring is only partially attached to the drum lid, or if a portion of the ring is missing, select another drum lid with a sealing ring that is in sound condition.

6.1.5 To prepare IDW drums for labeling, wipe clean the outer wall surfaces and drum lids of all material that might prevent legible and permanent labeling. If potentially contaminated material adheres to the outer surface of a drum, wipe that material from the drum, and segregate the paper towel or rag used to remove the material with visibly soiled PPE and disposable sampling equipment. Label all IDW drums and place them on pallets prior to storage.

6.2 Labeling

6.2.1 Containers used to store IDW must be properly labelled. Two general conditions exist: 1) from previous studies or on-site data, waste characteristics are known to be either hazardous or nonhazardous; or 2) waste characteristics are unknown until additional data are obtained.

6.2.2 For situations where the waste characteristics are known, the waste containers should be packaged and labelled in accordance with state regulations and any federal regulations that may govern the labelling of waste.

6.2.3 The following information shall be placed on all non-hazardous waste labels:

- Description of waste (i.e., purge water, soil cuttings);
- Contact information (i.e., contact name and telephone number);
- Date when the waste was first accumulated.

6.2.4 The following information shall be placed on all hazardous waste labels:

- Description of waste (i.e., purge water, soil cuttings);
- Generator information (i.e., name, address, contact telephone number);
- EPA identification number (supplied by on-site client representative);
- Date when the waste was first accumulated.

6.2.5 When the final characterization of a waste is unknown, a notification label should be placed on the drum with the words "waste characterization pending analysis" and the following information included on the label:

- Description of waste (i.e., purge water, soil cuttings);
- Contact information (i.e., contact name and telephone number);
- Date when the waste was first accumulated.

6.2.6 Once the waste has been characterized, the label should be changed as appropriate for a nonhazardous or hazardous waste.

6.2.7 Waste labels should be constructed of a weatherproof material and filled out with a permanent marker to prevent being washed off or becoming faded by sunlight. It is recommended that waste labels be placed on the side of the container, since the top is more subject to weathering. However, when multiple containers are accumulated together, it also may be helpful to include labels on the top of the containers to facilitate organization and disposal.

6.2.8 Each container of waste generated shall be recorded in the field notebook used by the person responsible for labelling the waste. After the waste is disposed of, either by transportation off-site or disposal on-site in an approved disposal area, an appropriate record shall be made in the same field notebook to document proper disposition of IDW.

6.3 Types of Site Investigation Waste

Several types of waste are generated during site investigations that may require special handling. These include solid, liquid, and used PPE, as discussed further below.

Solid Waste

Soil cuttings from boreholes will typically be placed in containers unless site specific requirements allow for soil cuttings to be placed back into the borehole after drilling is complete. Drilling mud generated during investigation activities shall be collected in containers. Covers should be included on the containers and must be secured at all times and only open during filling activities. The containers shall be labelled in accordance with this SOP. An inventory containing the source, volume, and description of material put in the containers shall be logged on prescribed forms and kept in the project file.

Non-hazardous solid waste can be disposed on-site in the designated site landfill or in a designated evaporation pond if it is liquefied. Hazardous wastes must be disposed off-site at an approved hazardous waste landfill.

Liquid Waste

Groundwater generated during monitoring well development, purging, and sampling can be collected in truck-mounted containers and/or other transportable containers (i.e., 55-gallon drums). Lids or bungs on drums must be secured at all times and only open during filling or pumping activities. The containers shall be labelled in accordance with this SOP. Non-hazardous liquid waste can be disposed of in one of the designated lined evaporation ponds on-site. Hazardous wastes must be handled separately and disposed off-site at an approved hazardous waste facility.

Personal Protective Equipment

PPE that is generated throughout investigation activities shall be placed in plastic garbage bags. If the solid or liquid waste that was being handled is characterized as hazardous waste, then the corresponding PPE should also be disposed as hazardous waste. If not, all PPE should be disposed as non-hazardous waste in the designated on-site landfill. Trash that is generated as part of field activities may be disposed of in the landfill as long as the trash was not exposed to hazardous media.

6.4 Waste Accumulation On-Site

6.4.1 Solid, liquid, or PPE waste generated during investigation activities that are classified as nonhazardous or "characterization pending analysis" should be disposed of as soon as possible. Until disposal, such containers should be inventoried, stored as securely as possible, and inspected regularly, as a general good practice.

6.4.2 Solid, liquid, or PPE waste generated during investigation activities that are classified as hazardous shall not be accumulated on-site longer than 90 days. All hazardous waste containers shall be stored in a secured storage area. The following requirements for the hazardous waste storage area must be implemented:

- Proper hazardous waste signs shall be posted as required by any state or federal statutes that may govern the labelling of waste;
- Secondary containment to contain spills;
- Spill containment equipment must be available;
- Fire extinguisher;
- Adequate aisle space for unobstructed movement of personnel.

6.4.3 Weekly storage area inspections shall be performed and documented to ensure compliance with these requirements. Throughout the project, an inventory shall be maintained to itemize the type and quantity of the waste generated.

6.5 Waste Disposal

6.5.1 Solid, liquid, and PPE waste will be characterized for disposal through the use of client knowledge, laboratory analytical data created from soil or groundwater samples gathered during the field activities, and/or composite samples from individual containers.

6.5.2 All waste generated during field activities will be stored, transported, and disposed of according to applicable state, federal, and local regulations. All wastes classified as hazardous will be disposed of at a licensed treatment storage and disposal facility or managed in other approved manners.

6.5.3 In general, waste disposal should be carefully coordinated with the facility receiving the waste. Facilities receiving waste have specific requirements that vary even for non-hazardous waste, so characterization should be conducted to support both applicable regulations and facility requirements.

6.6 Regulatory Requirements

The following federal and state regulations shall be used as resources for determining waste characteristics and requirements for waste storage, transportation, and disposal:

- Code of Federal Regulations (CFR), Title 40, Part 261;
- CFR, Title 49, Parts 172, 173, 178, and 179.

6.7 Waste Transport

A state-certified hazardous waste hauler shall transport all wastes classified as hazardous. Typically, the facility receiving any waste can coordinate a hauler to transport the waste. Shipped hazardous waste shall be disposed of in accordance with all RCRA/USEPA requirements. All waste manifests or bills of lading will be signed either by the client or the client's designee.

7.0 Quality Control and Assurance

7.1 Management of IDW must incorporate quality control measures to ensure conformance to these and the project requirements.

8.0 Records, Data Analysis, Calculations

8.1 Maintain records as required by implanting the procedures in this SOP.

8.2 Deviations from this procedure or the sampling and analysis plan shall be documented in field records. Significant changes shall be approved by the **Program Quality Manager**.

9.0 Attachments or References

Department of Defense, United States (DoD). 2005. *Uniform Federal Policy for Quality Assurance Project Plans, Part 1: UFP-QAPP Manual.* Final Version 1. DoD: DTIC ADA 427785, EPA-505-B-04-900A. In conjunction with the U. S. Environmental Protection Agency and the Department of Energy. Washington: Intergovernmental Data Quality Task Force. March. On-line updates available at: http://www.epa.gov/-fedfac/pdf/ufp_qapp_v1_0305.pdf.

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1998. *Management of Remediation Waste under RCRA*. EPA/530-F-98-026. Office of Solid Waste and Emergency Response. October.

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Author	Reviewer	Revisions (Technical or Editorial)
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOP SOP for use on USACE HTRW projects (April 2017)

AECOM

Equipment Decontamination

Procedure 3-06

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes methods of equipment decontamination, to be used for activities where samples for chemical analysis are collected or where equipment will need to be cleaned before leaving the site or before use in subsequent activities.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

It is the responsibility of the **Site Safety and Health Officer (SSHO)** to set up the site zones (i.e., exclusion, transition, and clean) and decontamination areas. Generally the decontamination area is located within the transition zone, upwind of intrusive activities, and serves as the washing area for both personnel and equipment to minimize the spread of contamination into the clean zone. Typically, for equipment, a series of buckets are set up on a visqueen-lined bermed area. Separate spray bottles containing cleaning solvents as described in this procedure or the Work Plan (WP) and distilled water are used for final rinsing of equipment. Depending on the nature of the hazards and the site location, decontamination of heavy equipment, such as augers, pump drop pipe, and vehicles, may be accomplished using a variety of techniques.

All **Field Personnel** responsible for equipment decontamination must adhere to the site-specific accident prevention plan (APP) and Site Safety and Health Plan (SSHP) and must wear the personal protective equipment (PPE) specified in the site-specific APP/SSHP. Generally this includes, at a minimum, Tyvek® coveralls, steel-toed boots with boot covers or steel-toed rubber boots, safety glasses, American National Standards Institute-standard hard hats, and hearing protection (if heavy equipment is in operation). Air monitoring by the **SSHO** may result in an upgrade to the use of respirators and cartridges in the decontamination area; therefore, this equipment must be available on site. If safe alternatives are not achievable, discontinue site activities immediately.

In addition to the aforementioned precautions, the following sections describe safe work practices that will be employed.

2.1 **Chemical Hazards associated with Equipment Decontamination**

- Avoid skin contact with and/or incidental ingestion of decontamination solutions and water.
- Utilize PPE as specified in the site-specific HSP to maximize splash protection.
- Refer to material safety data sheets, safety personnel, and/or consult sampling personnel regarding appropriate safety measures (i.e., handling, PPE including skin and respiratory).
- Take the necessary precautions when handling detergents and reagents.

2.2 **Physical Hazards associated with Equipment Decontamination**

- To avoid possible back strain, it is recommended to raise the decontamination area 1 to 2 feet above ground level.

- To avoid heat stress, over exertion, and exhaustion, it is recommended to rotate equipment decontamination among all site personnel.
- Take necessary precautions when handling field sampling equipment.

3.0 Terms and Definitions

None.

4.0 Training and Qualifications

4.1 The **Project Manager** is responsible for ensuring that decontamination activities comply with this procedure. The **Project Manager** is responsible for ensuring that all personnel involved in equipment decontamination shall have the appropriate education, experience, and training to perform their assigned tasks.

4.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

4.3 The **Site Supervisor (SS)** is responsible for ensuring that all field equipment is decontaminated according to this procedure.

4.4 All **Field Personnel** are responsible for the implementation of this procedure.

5.0 Procedure

Decontamination of equipment used in soil/sediment sampling, groundwater monitoring, well drilling and well development, as well as equipment used to sample groundwater, surface water, sediment, waste, wipe, asbestos, and unsaturated zone, is necessary to prevent cross-contamination and to maintain the highest integrity possible in collected samples. Planning a decontamination program requires consideration of the following factors:

- Location where the decontamination procedures will be conducted
- Types of equipment requiring decontamination
- Frequency of equipment decontamination
- Cleaning technique and types of cleaning solutions appropriate to the contaminants of concern
- Method for containing the residual contaminants and wash water from the decontamination process
- Use of a quality control measure to determine the effectiveness of the decontamination procedure

The following subsections describe standards for decontamination, including the frequency of decontamination, cleaning solutions and techniques, containment of residual contaminants and cleaning solutions, and effectiveness.

5.1 Decontamination Area

Select an appropriate location for the decontamination area at a site based on the ability to control access to the area, the ability to control residual material removed from equipment, the need to store clean equipment, and the ability to restrict access to the area being investigated. Locate the decontamination area an adequate distance away and upwind from potential contaminant sources to avoid contamination of clean equipment.

5.2 Types of Equipment

Drilling equipment that must be decontaminated includes drill bits, auger sections, drill-string tools, drill rods, split barrel samplers, tremie pipes, clamps, hand tools, and steel cable. Decontamination of monitoring well development and groundwater sampling equipment includes submersible pumps, bailers, interface probes, water level meters, bladder pumps, airlift pumps, peristaltic pumps, and lysimeters.

Other sampling equipment that requires decontamination includes, but is not limited to, hand trowels, hand augers, slide hammer samplers, shovels, stainless-steel spoons and bowls, soil sample liners and caps, wipe sampling templates, composite liquid waste samplers, and dippers. Equipment with a porous surface, such as rope, cloth hoses, and wooden blocks, cannot be thoroughly decontaminated and shall be properly disposed of after one use.

5.3 Frequency of Equipment Decontamination

Decontaminate down-hole drilling equipment and equipment used in monitoring well development and purging prior to initial use and between each borehole or well. Down-hole drilling equipment, however, may require more frequent cleaning to prevent cross-contamination between vertical zones within a single borehole. When drilling through a shallow contaminated zone and installing a surface casing to seal off the contaminated zone, decontaminate the drilling tools prior to drilling deeper. Initiate groundwater sampling by sampling groundwater from the monitoring well where the least contamination is suspected. Decontaminate groundwater, surface water, and soil sampling devices prior to initial use and between collection of each sample to prevent the possible introduction of contaminants into successive samples.

5.4 Cleaning Solutions and Techniques

Decontamination can be accomplished using a variety of techniques and fluids. The preferred method of decontaminating major equipment, such as drill bits, augers, drill string, and pump drop-pipe, is steam cleaning. To steam clean, use a portable, high-pressure steam cleaner equipped with a pressure hose and fittings. For this method, thoroughly steam wash equipment and rinse it with potable tap water to remove particulates and contaminants.

A rinse decontamination procedure is acceptable for equipment such as bailers, water level meters, new and re-used soil sample liners, and hand tools. The decontamination procedure shall consist of the following: (1) wash with a non-phosphate detergent (Alconox®, Liquinox®, or other suitable detergent) and potable water solution; (2) rinse with potable water; (3) spray with laboratory-grade isopropyl alcohol; (4) rinse with deionized or distilled water; and (5) spray with deionized or distilled water. If possible, disassemble equipment prior to cleaning. Add a second wash at the beginning of the process if equipment is very soiled.

Decontaminating submersible pumps requires additional effort because internal surfaces become contaminated during usage. Decontaminate these pumps by washing and rinsing the outside surfaces using the procedure described for small equipment or by steam cleaning. Decontaminate the internal surfaces by recirculating fluids through the pump while it is operating. This recirculation may be done using a relatively long (typically 4 feet) large-diameter pipe (4-inch or greater) equipped with a bottom cap. Fill the pipe with the decontamination fluids, place the pump within the capped pipe, and operate the pump while recirculating the fluids back into the pipe. The decontamination sequence shall include: (1) detergent and potable water; (2) potable water rinse; (3) potable water rinse; and (4) deionized water rinse. Change the decontamination fluids after each decontamination cycle.

Solvents other than isopropyl alcohol may be used, depending upon the contaminants involved. For example, if polychlorinated biphenyls or chlorinated pesticides are contaminants of concern, hexane may be used as the decontamination solvent; however, if samples are also to be analyzed for volatile organics, hexane shall not be used. In addition, some decontamination solvents have health effects that must be considered. Decontamination water shall consist of distilled or deionized water. Steam-distilled water shall not be used in the decontamination process as this type of water usually contains elevated concentrations of metals. Decontamination solvents to be used during field activities will be specified in the CTO WP.

Rinse equipment used for measuring field parameters, such as pH (indicates the hydrogen ion concentration – acidity or basicity), temperature, specific conductivity, and turbidity with deionized or distilled water after each measurement. Also wash new, unused soil sample liners and caps with a fresh detergent solution and rinse them with potable water followed by distilled or deionized water to remove any dirt or cutting oils that might be on them prior to use.

5.5 **Containment of Residual Contaminants and Cleaning Solutions**

A decontamination program for equipment exposed to potentially hazardous materials requires a provision for catchment and disposal of the contaminated material, cleaning solution, and wash water.

When contaminated material and cleaning fluids must be contained from heavy equipment, such as drill rigs and support vehicles, the area must be properly floored, preferably with a concrete pad that slopes toward a sump pit. If a concrete pad is impractical, planking can be used to construct solid flooring that is then covered by a nonporous surface and sloped toward a collection sump. If the decontamination area lacks a collection sump, use plastic sheeting and blocks or other objects to create a bermed area for collection of equipment decontamination water. Situate items, such as auger flights, which can be placed on metal stands or other similar equipment, on this equipment during decontamination to prevent contact with fluids generated by previous equipment decontamination. Store clean equipment in a separate location to prevent recontamination. Collect decontamination fluids contained within the bermed area and store them in secured containers as described below.

Use wash buckets or tubs to catch fluids from the decontamination of lighter-weight drilling equipment and hand-held sampling devices. Collect the decontamination fluids and store them on site in secured containers, such as U.S. Department of Transportation-approved drums, until their disposition is determined by laboratory analytical results. Label containers in accordance with Procedure 3-05, *IDW Management*.

6.0 Quality Control and Assurance

A decontamination program must incorporate quality control measures to determine the effectiveness of cleaning methods. Quality control measures typically include collection of equipment blank samples or wipe testing. Equipment blanks consist of analyte-free water that has been poured over or through the sample collection equipment after its final decontamination rinse. Wipe testing is performed by wiping a cloth over the surface of the equipment after cleaning. These quality control measures provide "after-the fact" information that may be useful in determining whether or not cleaning methods were effective in removing the contaminants of concern.

7.0 Records, Data Analysis, Calculations

Any project where sampling and analysis is performed shall be executed in accordance with an approved sampling and analysis plan. This procedure may be incorporated by reference or may be incorporated with modifications described in the plan.

Deviations from this procedure or the sampling and analysis plan shall be documented in field records. Significant changes shall be approved by the **Program Quality Manager**.

8.0 Attachments or References

8.1 ASTM Standard D5088. 2008. *Standard Practice for Decontamination of Field Equipment Used at Waste Sites.* ASTM International, West Conshohocken, PA. 2008. DOI: 10.1520/D5088-02R08. www.astm.org.

8.2 NAVSEA T0300-AZ-PRO-010. *Navy Environmental Compliance Sampling and Field Testing Procedures Manual*. August 2009.

8.3 Procedure 3-05, *IDW Management*.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

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Land Surveying

Procedure 3-07

1.0 Purpose and Scope

1.1 The purpose of this document is to define the standard operating procedure (SOP) for acquiring land surveying data to facilitate the location and mapping of geologic, hydrologic, geotechnical data, and analytical sampling points and to establish topographic control over project sites.

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM.

1.3 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review. If there are procedures whether it be from AECOM, state and/or federal that are not addressed in this SOP and are applicable to surface water sampling then those procedures may be added as an appendix to the project specific SAP.

1.4 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Program Quality Manager. Deviations to this SOP will be documented in the field records.

1.5 If there are procedures, whether it be from AECOM, state and/or federal, that are not addressed in this SOP and are applicable to land surveying then those procedures may be added as an appendix to the project specific Sampling and Analysis Plan (SAP).

2.0 Safety

2.1 Depending upon the site-specific contaminants, various protective programs must be implemented prior to conducting fieldwork. All **field sampling personnel** must review the project-specific Accident Prevention Plan (APP) with Site-Safety and Health Plan (SSHP), paying particular attention to the control measures planned for the specific field tasks. Conduct preliminary area monitoring to determine the potential hazard to field sampling personnel. If significant contamination is observed, minimize contact with potential contaminants in both the vapor and liquid phase through the use of respirators and disposable clothing.

2.2 In addition, observe standard health and safety practices according to the project-specific APP/SSHP. Suggested minimum protection includes inner disposable vinyl gloves, outer chemical-protective nitrile gloves, rubberized steel-toed boots, and an American National Standards Institute-standard hard hat. Half-face respirators and cartridges and Tyvek® suits may be necessary depending on the contaminant concentrations, and shall always be available on site.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the **Site Safety and Health Officer (SSHO)** or designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSHO.

2.4 The health and safety considerations for the work associated with land surveying include:

- Slip, trips and falls associated with work in the field;

- Biological hazards associated with work in the field; and,
- Potential hazards associated with contaminants of concern (COC) that may be located in the survey area,

3.0 Terms and Definitions

3.1 Boundary Survey

Boundary surveys are conducted by Certified Land Surveyors in order to delineate a legal property line for a site or section of a site.

3.2 Global Positioning System (GPS)

A system of satellites, computers, and receivers that is able to determine the latitude and longitude of a receiver on Earth by calculating the time difference for signals from different satellites to reach the receiver.

4.0 Interferences

4.1 Commercially available GPS units typically have a level of precision of (±) 3 to 5 meters. Field corrections can be made as described in Section 8.3 below.

5.0 Training and Qualifications

5.1 Qualifications and Training

5.1.1 The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The **Project Manager** is responsible for ensuring that land surveying activities comply with this procedure. The Project Manager is responsible for ensuring that all field sampling personnel involved in land surveying shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Site Supervisor (SS)** is responsible for ensuring that all field personnel follow these procedures. In virtually all cases, subcontractors will conduct these procedures. The SS or designee is responsible for overseeing the activities of the subcontractor and ensuring that sampling points and topographic features are properly surveyed.

6.0 Equipment and Supplies

6.1 The following equipment list contains materials that may be needed in carrying out the procedures outlined in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP;
- Commercially available GPS unit; and,
- Field Logbook.

7.0 Calibration or Standardization

7.1 An authorized manufacturer's representative shall inspect and calibrate survey instruments in accordance with the manufacturer's specifications regarding procedures and frequencies. At a minimum, instruments shall be calibrated no more than six months prior to the start of the survey work.

7.2 Standards for all survey work shall be in accordance with National Oceanic and Atmospheric Administration standards and, at a minimum, with accuracy standards set forth below. The horizontal accuracy for the location of all grid intersection and planimetric features shall be (±) 0.1 feet. The horizontal accuracy for boundary surveys shall be 1 in 10,000 feet (1:10,000). The vertical accuracy for ground surface elevations shall be (±) 0.1 feet. Benchmark elevation accuracy and elevation of other permanent features, including monitoring wellheads, shall be (±) 0.01 feet.

8.0 Procedure

8.1 Theodolite/Electronic Distance Measurement (EDM)

Follow the procedures listed below during theodolite/EDM land surveying:

- A land surveyor registered in the state or territory in which the work is being performed shall directly supervise all surveying work.
- Reference surveys to the local established coordinate systems and base all elevations and benchmarks established on U.S. Geological Survey datum, 1929 general adjustment.
- Reference surveyed points to Mean Sea Level (Lower Low Water Level).
- Jointly determine appropriate horizontal and vertical control points prior to the start of survey activities. If discrepancies in the survey (e.g., anomalous water level elevations) are observed, the surveyor may be required to verify the survey by comparison to a known survey mark. If necessary, a verification survey may be conducted by a qualified third party.
- All field notes, sketches, and drawings shall clearly identify the horizontal and vertical control points by number designation, description, coordinates, and elevations. Map all surveyed locations using a base map or other site mapping, as specified by the project Work Plan or SAP.
- Begin and end all surveys at the designated horizontal and vertical control points to determine the degree of accuracy of the surveys.
- Iron pins used to mark control points shall be made of reinforcement steel or an equivalent material and shall be 18 inches long with a minimum diameter of 5/8 inch. Drive pins to a depth of 18 inches into the soil.
- Stakes used to mark survey lines and points shall be made from 3-foot lengths of 2-inch by 2-inch lumber and pointed at one end. Clearly mark them with brightly colored weatherproof flagging and paint.
- Clearly mark the point on a monitoring well casing or well riser that is surveyed by filing grooves into the casing/riser on either side of the surveyed point, or by marking the riser with a permanent ink marker.

8.2 Global Positioning System (GPS) to Conduct Land Survey

Follow the procedures listed below during land surveying using GPS:

- A land surveyor registered in the state or territory in which the work is being performed shall directly supervise all surveying work.
- Reference surveys to the local established coordinate systems and base all elevations and benchmarks established on U.S. Geological Survey datum, 1929 general adjustment.

- All field notes, sketches, and drawings shall clearly identify the horizontal and vertical control points by number designation, description, coordinates, and elevations. Map all surveyed locations using a base map or other site mapping, as specified in the project Work Plan or SAP.
- Begin and end all surveys at the designated horizontal and vertical control points (as applicable) to determine the degree of accuracy of the surveys.
- Iron pins used to mark control points shall be made of reinforcement steel or an equivalent material and shall be 18 inches long with a minimum diameter of 5/8 inch. Drive pins to a depth of 18 inches into the soil.
- Stakes used to mark survey lines and points shall be made from 3-foot lengths of 2-inch by 2-inch lumber and pointed at one end. Clearly mark them with brightly colored weatherproof flagging and paint.
- Clearly mark the point on a monitoring well casing that is surveyed by filing grooves into the casing on either side of the surveyed point.

8.3 Global Positioning System (GPS) to Position Sample Locations or Locate Site Features

Experienced field personnel may use a GPS system unit to position sample locations (e.g. grid positioned samples, soil boring locations) at a site. The decision to use field personnel or a licensed land surveyor will depend on the objectives of the survey (e.g. vertical elevation is not required) and the levels of precision required. Typically when a level of precision greater than (±) 3 to 5 meters is required, a licensed surveyor will be required. When a level of precision of (±) 3 to 5 meters is sufficient to meet project requirements (i.e. when laying sampling grids, identifying significant site features, or locating features identified in GIS figures) experienced field personnel may use commercially available, consumer-grade GPS units. Follow the procedures listed below to locate samples or site features using GPS:

- A commercially available GPS unit with Wide Angle Averaging System (WAAS), topographic map display, and waypoint storage capabilities should be used.
- If waypoints are to be imported into a GIS database, the same grid projection system should be used.
- If a permanent reference point near the site is available, it is recommended that a waypoint at this location be taken every day waypoints are stored.
- When laying out a sampling grid from a GIS map, upload the coordinates from GIS to the GPS unit, including coordinates for an easily identified, permanent, nearby feature (i.e. building corner, roadway intersection, or USGS benchmark).
- If during the initial site walk, the permanent feature identified does not overlay within (±) 5 meters as identified in the GPS unit, field corrections of the waypoints should be made.
- Field corrections can be made by adding/subtracting the difference in x,y coordinates between the field measurement of the permanent site feature and the anticipated x,y coordinates. This correction should then be applied to the x,y coordinates for each sampling location to be marked. Corrected x,y coordinates can then be uploaded into the GPS unit.
- Sampling points and site features can then be located in the field using the GPS units "Go To" function. When the distance to the sampling point or feature remains close to zero, the location can be marked.
- If no field corrections to the sampling location need to be made, or if sampling locations are to be surveyed by a licensed surveyor at a later date, no additional waypoints need to be taken. If significant changes to the sampling location are made, GPS coordinates at the corrected location shall be stored and labeled.

- It is recommended that GPS coordinates be uploaded to a storage device such as PC at the end of each day.
- Field logs shall indicate manufacturer and model number for GPS unit used, map datum and projection used, and any field corrections made. If the GPS unit cannot lock onto a WAAS system at the site, this should also be noted.

9.0 Quality Control and Assurance

None.

10.0 Data and Records Management

The surveyor shall record field notes daily using generally accepted practices. The data shall be neat, legible, in indelible ink, and easily reproducible. Copies of the surveyor's field notes and calculation forms generated during the work shall be obtained and placed in the project files.

Surveyor's field notes shall, at a minimum, clearly indicate:

- The date of the survey;
- General weather conditions;
- The name of the surveying firm;
- The names and job titles of personnel performing the survey work;
- Equipment used, including serial numbers; and,
- Field book designations, including page numbers.

A land surveyor registered in the state or territory in which the work was done shall sign, seal, and certify the drawings and calculations submitted by the surveyor.

Dated records of land surveying equipment calibration shall be provided by the surveyor and placed in the project files. Equipment serial numbers shall be provided in the calibration records.

11.0 Attachments or References

Department of Defense, United States (DoD). 2005. *Uniform Federal Policy for Quality Assurance Project Plans, Part 1: UFP-QAPP Manual*. Final Version 1. DoD: DTIC ADA 427785, EPA-505-B-04-900A. In conjunction with the U. S. Environmental Protection Agency and the Department of Energy. Washington: Intergovernmental Data Quality Task Force. March. On-line updates available at: http://www.epa.gov/fedfac/pdf/ufp_qapp_v1_0305.pdf.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
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Surface Water and Liquid Sampling

Procedure 3-10

1.0 Purpose and Scope

1.1 The purpose of this document is to define the standard operating procedure (SOP) for surface water and liquid sampling (for example, liquid characterization sampling). This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to surface water samples from shallow and deep water using a variety of samplers. Specific information regarding coring locations can be found in the associated Sampling and Analysis Plan (SAP).

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM under contract to the United States Army Corp of Engineers (USACE).

1.3 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review. If there are procedures whether it be from Resolution Consultants, state and/or federal that are not addressed in this SOP and are applicable to surface water sampling then those procedures may be added as an appendix to the project specific SAP.

1.4 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Program Quality Manager. Deviations to this SOP will be documented in the field records.

2.0 Safety

2.1 Depending upon the site-specific contaminants, various protective programs must be implemented prior to sampling the first surface water sampling location. All **field sampling personnel** responsible for sampling activities must review the project-specific Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP) paying particular attention to the control measures planned for the sampling tasks. Conduct preliminary area monitoring to determine the potential hazard to field sampling personnel. If significant contamination is observed, minimize contact with potential contaminants in both the vapor and liquid phase through the use of respirators and disposable clothing.

2.2 In addition, observe standard health and safety practices according to the project-specific APP/ SSHP. Suggested minimum protection during well sampling activities includes inner disposable vinyl gloves, outer chemical-protective nitrile gloves, rubberized steel-toed boots, and an American National Standards Institute-standard hard hat. Half-face respirators and cartridges and Tyvek® suits may be necessary depending on the contaminant concentrations, and shall always be available on site.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the **Site Safety and Health Officer (SSHO)** or designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSHO.

2.4 The health and safety considerations for the work associated with surface water sampling include:

- Proper selection of personal protective equipment for work around water bodies (e.g., personal flotation devices [PFDs]), as specified in the project-specific APP.
- Appropriate health and safety protocols for working in a boat (if applicable), as specified in the project-specific APP.
- Proper lifting techniques when retrieving surface water samplers, large muscles of the legs should be used, not the back.
- Stay clear of all moving equipment and avoid wearing loose fitting clothing.
- To avoid slip/trip/fall hazards as a result of working on wet surfaces, wear work boots/work boot covers with textured soles.
- To avoid heat/cold stress as a result of exposure to extreme temperatures and PPE, drink electrolyte replacement fluids (1 to 2 cups per hour is recommended), and in cases of extreme cold, wear fitted insulated clothing

3.0 Terms and Definitions

None.

4.0 Interferences

None.

5.0 Training and Qualifications

5.1 Qualifications and Training

5.1.1 The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The **Project Manager** is responsible for ensuring that surface water sampling activities comply with this procedure. The Project Manager or designee shall review all surface water sampling forms on a minimum monthly basis. The Project Manager is responsible for ensuring that all field sampling personnel involved in surface water sampling shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Site Supervisor (SS)** is responsible for ensuring that all field sampling personnel follow these procedures.

5.2.4 **Field sampling personnel** are responsible for the implementation of this procedure. Minimum qualifications for field sampling personnel require that one individual on the field team shall have a minimum of 6 months of experience with surface water sampling.

5.2.5 The **field sampler and/or task manager** is responsible for directly supervising the surface water sampling procedures to ensure that they are conducted according to this procedure, and for recording all pertinent data collected during sampling. If deviations from the procedure are required because of anomalous field conditions, they must first be approved by the Program Quality Manager and then documented in the field logbook and associated report or equivalent document.

6.0 Equipment and Supplies

The following equipment list contains materials that may be needed in carrying out the procedures outlined in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Work Plan
- Maps/Plot plan
- Tape measure
- Survey stakes, flags, or buoys
- Camera and film
- Stainless steel, plastic, or other appropriate composition (e.g., Teflon) bucket
- Laboratory supplied sampling containers
- Ziploc plastic bags for samples, and sample jars
- Logbook
- Labels
- Chain of Custody (COC) forms
- Site description forms
- Cooler(s)
- Ice
- Equipment/Apparatus
- Decontamination supplies/equipment
- Spade or shovel
- Spatula
- Scoop
- Trowel
- Task specific surface water sampling equipment

7.0 Calibration or Standardization

None.

8.0 Procedure

8.1 Selection of Sampling Techniques

Proper selection of sampling points and collection methodology are essential to meeting the objectives of a surface water sampling program. Sampling points should be selected for collection of surface water samples on the basis of characteristics of the body of surface water body to be monitored, the location of the body of surface water, and its hydrologic boundaries with respect to the site. Other considerations include the contaminants of concern, logistical considerations, such as access to the surface water body, the direction of flow, and determination of a background location.

Methods of collecting surface water samples vary from hand sampling procedures at a single point to sophisticated, multipoint sampling techniques. The number and type of samples to be collected depends on the characteristics of the body of water, the amount of suspended sediment that a moving body carries, the size of the discharge area at the site, and other factors. Multipoint sampling techniques apply to larger bodies of water; the samples are composited to provide a more representative sample.

Whenever possible, the sampling device, either disposable or constructed of a nonreactive material, should hold at least 500 milliliters to minimize the number of times the liquid must be disturbed, thus reducing agitation of any sediment layers. A 1-liter polypropylene or stainless steel beaker with a pour spout and handle works well. Any sampling device might contribute contaminants to a sample. The correct sampling device will not compromise the integrity of the sample and will give the desired analytical results.

8.1.1 Shallow Water Body Surface Water Sample Collection

A dip or grab sample is appropriate for a small body of water, or for collecting near-surface samples in a larger surface water body. The sampling method involves filling a sample container by submerging it either just below the surface, or by lowering the container to a desired depth by using a weighted holder. For shallow bodies of surface water, hold the sample container carefully just beneath the water surface to avoid disturbing the streambed and stirring the sediment. Position the container's mouth so that it faces upstream, while the sampling personnel are standing downstream. Any preservative added to the sample should be added after sample collection to avoid loss of preservative. Alternatively, a transfer device may be dipped into the water, and then the contents transferred to the appropriate container containing the preservative. For near-surface sample collection in a large surface water body, a pond sampler may be used if an extended reach is required to collect a representative sample. A pond sampler consists of a single use sample container attached to a telescoping, heavy-duty, aluminium pole via an adjustable clamp attached to the end. The collection technique for shallow surface water samples can be used for near-surface samples in a large surface water body.

8.1.2 Deep Surface Water Sample Collection

For deeper surface water bodies, either sample containers or transfer devices may be used to collect a sample. A weighted holder that allows either a sample transfer device or a sample container to be lowered, opened for filling, closed, and returned to the surface is suggested for sampling deeper surface water bodies. This is because concentrations of constituents near the surface of a deeper body of surface water might differ from the total concentration distributed throughout the water column cross section and thus a surface sample would not be representative of the water body. An open container that is lowered and raised to the surface at a uniform rate so that the bottle is just filled on reaching the surface is appropriate for deeper stagnant water bodies, however this method does not collect a truly representative sample in deeper flowing surface water bodies.

Kemmerer Samplers. Collect samples near the shore unless sampling from a boat is feasible and permitted. If a boat is used, the body of water should be cross-sectioned and samples should be collected at various depths across the water in accordance with the project specific SAP. The Kemmerer Sampler consists of a glass, plastic, or Teflon bottle, a weighted sinker, a bottle stopper, and a line that is used to open the bottle and to lower and raise the sampler during sampling. The general procedure for using the sampler is as follows (or refer to manufacturer’s instructions):

1. Obtain the sampler and check the knot at the bottom of the sampler for tightness and size. The knot should be sufficiently large so that it will not pull through the central tube of the sampler.
2. Assemble the weighted bottle sampler for making the cast by pulling the trip head into the trip plate. This can be done by holding the top and bottom stoppers and giving a short, hard pull to the bottom stopper.
3. Measure and mark the desired depth on the sampling line. Tie the free end of the line to the railing of the vessel to prevent accidental dropping of the sampler.

4. Gently lower the sampler to the desired depth so as not to remove the stopper prematurely.
5. Pull out the stopper with a sharp jerk of the sampler line or by lowering a messenger down the line to trip the stoppers.
6. Allow the bottle to fill completely, as evidenced by the cessation of air bubbles.
7. Raise the sampler and cap the bottle. Untie the line from the railing and carry the sampler to your sampling station.
8. Transfer water into appropriate sample containers. Preserve the sample, if necessary, following guidelines in the project-specific SAP. In most cases, place preservatives in sample containers before sample collection to avoid overexposure of samples and overfilling of bottles during collection.
9. Check that a Teflon liner is present in the cap, if required. Secure the cap tightly.
10. Fill out the sample label and record all relevant information in the sample collection form, the field logbook, and/or the field laptop/tablet. In addition, the chain of custody form should be filled out as soon as possible. These procedures should be done in accordance with SOP 3-03 Recordkeeping, Sample Labeling, and Chain of Custody.
11. Immediately place the properly labeled sample bottle(s) in a cooler with ice.
12. Wipe the sample clean and decontaminate if necessary for the collection of additional samples. Decontaminate according to the procedures in SOP 3-06 Equipment Decontamination.
13. Always store the sampler in the open position (stoppers not in the tube).

Teflon Bailers. Teflon bailers can also been used to collect samples in deep bodies of water. When the use of Teflon bailers is deemed appropriate for sampling water from a specific depth, the bailers shall be equipped with a check valve that closes during sample retrieval.

1. Attach a line that is premeasured to the appropriate sampling depth to the dedicated Teflon bailer and lower to the desired depth.
2. Ensure that the check valve is engaged tugging on the line with a sharp jerk.
3. Raise the bailer and transfer the water to sample containers. Preserve the sample, if necessary, following guidelines in the project-specific SAP. In most cases, place preservatives in sample containers before sample collection to avoid overexposure of samples and overfilling of bottles during collection.
4. Check that a Teflon liner is present in the cap, if required. Secure the cap tightly.
5. Fill out the sample label and record all relevant information in the sample collection form, the field logbook, and/or the field laptop/tablet. In addition, the chain of custody form should be filled out as soon as possible. These procedures should be done in accordance with SOP 3-03 Recordkeeping, Sample Labeling, and Chain of Custody.
6. Immediately place the properly labeled sample bottle(s) in a cooler with ice.
7. A new dedicated bailer and new line should be used for each sampling location.

Peristaltic Pump. Another method of extending the reach of sampling efforts is to use a small peristaltic pump. In this method, the sample is drawn through heavy-wall Teflon tubing and pumped directly into the sample container. This system allows the operator to reach into the liquid body, sample from depth, or sweep the width of narrow streams.

If medical-grade silicon tubing is used in the peristaltic pump, the system is suitable for sampling almost any analyte, including most organics. Some volatile stripping may occur; due to the relatively high flow rate of the pump. Therefore, avoid pumping methods for sampling volatile organics. Battery-operated peristaltic pumps are available and can be easily carried by hand or with a shoulder sling, as needed. It is necessary in most situations to change both the Teflon suction line and the silicon pump tubing between sampling locations to avoid cross contamination. This action requires maintaining a sufficiently large stock of material to avoid having to clean the tubing in the field.

Peristaltic pumps work especially well for sampling large bodies of water when a near-surface sample will not sufficiently characterize the body as a whole. When sampling a liquid stream that exhibits a considerable flow rate, it may be necessary to weight the bottom of the suction line.

Use the following procedures for collecting samples using peristaltic pumps:

1. Install clean, silicone tubing in the pump head, per the manufacturer's instructions. Pharmaceutical-grade silicone tubing (e.g., PharMed tubing) may be required for some projects depending on the analyses required. Refer to the project specific SAP for specific tubing requirements. Allow sufficient tubing on the discharge side to facilitate convenient dispensation of liquid into sample bottles but only enough on the suction end for attachment to the intake line. This practice will minimize sample contact with the silicone pump tubing. (Some types of thinner Teflon tubing may be used.).
2. Select the length of suction intake tubing necessary to reach the required sample depth and attach it to the tubing on the intake side of the pump. If necessary, a small weight composed of inert material (e.g., stainless steel) which will not react with chemicals of concern may be used to weight the intake tubing. Heavy-wall Teflon of a diameter equal to the required pump tubing will suit most applications. (A heavier wall will allow for a slightly greater lateral reach.)
3. A purge volume that is at a minimum equal to the tubing volume should be passed through the system prior to sample collection. Collect this purge volume in a bucket. Once the sample has been collected, the purged water volume can be returned to the water body.
4. Fill necessary sample bottles by allowing pump discharge to flow gently down the side of bottle with smooth laminar flow and minimal entry turbulence. Cap each bottle as it is filled.
5. Preserve the sample, if necessary, following guidelines in the project-specific SAP. In most cases, place preservatives in sample containers before sample collection to avoid overexposure of samples and overfilling of bottles during collection.
6. Check that a Teflon liner is present in the cap, if required. Secure the cap tightly.
7. Fill out the sample label and record all relevant information in the sample collection form, the field logbook, and/or the field laptop/tablet. In addition, the chain of custody form should be filled out as soon as possible. These procedures should be done in accordance with SOP 3-03 Recordkeeping, Sample Labeling, and Chain of Custody.
8. Immediately place the properly labeled sample bottle in a cooler with ice.
9. Allow the system to drain thoroughly, and then disassemble.

8.2 Transfer Devices

Samples from various locations and depths can be composited if project quality objectives indicate that it is appropriate; otherwise, collect separate samples. Identify approximate sampling points on a sketch of the water body. Use the following procedures for collecting samples using transfer devices:

1. Submerge a stainless steel dipper or other suitable device, causing minimal disturbance to the surface of the water and the sediment at the floor of the surface water body. Note the approximate depth and location of the sample source (e.g., 1 foot up from bottom or just below the surface).
2. Allow the device to fill slowly and continuously.
3. Retrieve the dipper or device from the surface water with minimal disturbance.
4. Remove the cap from the sample bottle and slightly tilt the mouth of the bottle below the dipper or device edge.
5. Empty the dipper or device slowly, allowing the sample stream to flow gently down the side of the bottle with smooth laminar flow and minimal entry turbulence.
6. Continue delivery of the sample until the bottle is filled.
7. If necessary, preserve the sample according to guidelines in the project-specific SAP. In most cases, place preservatives in sample containers before sample collection to avoid overexposure of samples and overfilling of bottles during collection.

8. Check that a Teflon liner is present in the cap, if required. Secure the cap tightly.
9. Fill out the sample label and record all relevant information in the sample collection form, the field logbook, and/or the field laptop/tablet. In addition, the chain of custody form should be filled out as soon as possible. These procedures should be done in accordance with SOP 3-03 Recordkeeping, Sample Labeling, and Chain of Custody.
10. Dismantle the sampler and decontaminate according to the procedures in SOP 3-06 Equipment Decontamination.

Multipoint sampling techniques that represent both dissolved and suspended constituents and both vertical and horizontal distributions are applicable to larger bodies of water. Subsequent to sample collection, multipoint sampling techniques may require a compositing and sub-sampling process to homogenize all the individual samples into the number of subsamples required to perform the analyses of interest. Homogenizing samples is discouraged for samples collected for volatile organic analysis, because aeration causes a loss of volatile compounds. If collection of composite samples is required, then include the procedure for compositing in the project-specific work plan.

The sampling devices selected must not compromise sample integrity. Collect samples with either disposable devices, or devices constructed of a nonreactive material, such as glass, stainless steel, or Teflon. The device must have adequate capacity to minimize the number of times the liquid must be disturbed, reducing agitation of any sediment layers. Further, the device must be able to transfer the water sample into the sample container without loss of volatile compounds. A single- or double-check valve or stainless steel bailer made of Teflon equipped with a bottom discharging device may be utilized.

All equipment used for sample collection must be decontaminated before and after use in accordance with Procedure 3-06 – Equipment Decontamination.

9.0 Quality Control and Assurance

9.1 Field personnel will follow specific quality assurance (QA) guidelines as outlined in the project-specific SAP. The goal of the QA program should be to ensure precision, accuracy, representativeness, completeness, and comparability in the project sampling program.

9.2 Quality Control (QC) requirements for sample collection are dependent on project-specific sampling objectives. The project-specific SAP will provide requirements for sample preservation, holding times, container types, as well as various QC samples such as trip blanks, field blanks, equipment blanks, and field duplicates.

10.0 Data and Records Management

10.1 Field notes will be kept during sampling activities in accordance with SOP 3-03 – Recordkeeping, Sample Labeling, and Chain of Custody. During the completion of sampling activities, fill out the sample logbook and transmit forms to the CTO Manager for storage in project files.

10.2 Deviations to the procedures detailed in the SOP should be recorded in the field logbook.

11.0 Attachments or References

Department of Defense, United States (DoD). 2005. *Uniform Federal Policy for Quality Assurance Project Plans, Part 1: UFP-QAPP Manual*. Final Version 1. DoD: DTIC ADA 427785, EPA-505-B-04-900A. In conjunction with the U. S. Environmental Protection Agency and the Department of Energy. Washington: Intergovernmental Data Quality Task Force. March. On-line updates available at: http://www.epa.gov/fedfac/pdf/ufp_qapp_v1_0305.pdf.

Environmental Protection Agency, United States (EPA). 1987. *A Compendium of Superfund Field Operations Methods*. EPA/540/P-87/001, EPA, Office of Emergency and Remedial Response, Washington, D.C.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Robert Shoemaker Senior Scientist	Naomi Ouellette, Project Manager	Rev 0 – Initial Issue
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Monitoring Well Installation

Procedure 3-12

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the methods to be used during the installation of groundwater monitoring wells. It describes the components of monitoring well design and installation and sets forth the rationale for use of various well installation techniques in specific situations.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP). In the absence of a APP/SSHP, work will be conducted according to the Contract Task Order (CTO) Work Plan (WP) and/or direction from the **Site Safety and Health Officer (SSHO)**.

2.2 Before well installation commences, appropriate entities (e.g. DigSafe, local public works departments, company facilities) must be contacted to assure the anticipated well locations are marked for utilities, including electrical, telecommunications, water, sewer, and gas.

2.3 Physical Hazards Associated with Well Installation

- Stay clear of all moving equipment and avoid wearing loose fitting clothing.
- When using an approved retractable-blade knife, always cut away from one self and make sure there are no other people in the cutting path or the retractable-blade knife.
- To avoid slip/trip/fall conditions during drilling activities, keep the area clear of excess soil cuttings and groundwater. Use textured boots/boot cover bottoms in muddy areas.
- To avoid heat/cold stress as a result of exposure to extreme temperatures and personal protective equipment (PPE), drink electrolyte replacement fluids (1 to 2 cups per hour is recommended) and, in cases of extreme cold, wear fitted insulating clothing.
- To avoid hazards associated with subsurface utilities, ensure all sampling locations have been properly surveyed as described in SOP 3-01, Utility Clearance.
- Be aware of restricted mobility caused by PPE.

3.0 Terms and Definitions

3.1 **Annulus:** The annulus is the down-hole space between the borehole wall and the well casing and screen.

3.2 **Bridge:** A bridge is an obstruction in the drill hole or annulus. A bridge is usually formed by caving of the wall of the well bore, by the intrusion of a large boulder, or by the placement of filter pack materials during well completion. Bridging can also occur in the formation during well development.

3.3 **Filter Pack:** Filter pack is sand or gravel that is smooth, uniform, clean, well-rounded, and siliceous. It is placed in the annulus of the well between the borehole wall and the well screen to prevent formation materials from entering the well and to stabilize the adjacent formation.

3.4 **Grout:** Grout is a fluid mixture of cement and water that can be forced through a tremie pipe and emplaced in the annular space between the borehole and casing to form an impermeable seal. Various additives, such as sand, bentonite, and polymers, may be included in the mixture to meet certain requirements.

3.5 **Heaving (Running) Sands:** Loose sands in a confined water-bearing zone or aquifer which tend to rise up into the drill stem when the confining unit is breached by the drill bit. Heaving sands occur when the water in the aquifer has a pressure head great enough to cause upward flow into the drill stem with enough velocity to overcome the weight of the sand.

3.6 **Sieve Analysis:** Sieve analysis is the evaluation of the particle-size distribution of a soil, sediment, or rock by measuring the percentage of the particles that will pass through standard sieves of various sizes.

4.0 Interferences

4.1 Heaving sands may be problematic in unconsolidated sands encountered below the water table.

4.2 Rotary drilling methods requiring bentonite-based drilling fluids should be used with caution to drill boreholes that will be used for monitoring well installation. The bentonite mud builds up on the borehole walls as a filter cake and permeates the adjacent formation, potentially reducing the permeability of the material adjacent to the well screen.

4.3 If water or other drilling fluids have been introduced into the boring during drilling or well installation, samples of these fluids should be obtained and analyzed for chemical constituents that may be of interest at the site. In addition, an attempt should be made to recover the quantity of fluid or water that was introduced, either by flushing the borehole prior to well installation and/or by overpumping the well during development.

4.4 Track-mounted drill rigs are suitable for travelling on many types of landscapes that truck-mounted units cannot access, but may have limitations on extremely uneven or soft terrain.

4.5 Care should be taken to prevent cross-contamination between well locations. All drilling equipment coming in contact with potentially contaminated soil and/or groundwater will be decontaminated by the drilling subcontractor prior to initial drilling activities and between drilling locations in accordance with SOP 3-06, Equipment Decontamination.

5.0 Training and Qualifications

5.1 **Qualifications and Training**

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 **Responsibilities**

5.2.1 **Project Managers** are responsible for issuing sampling and analysis plans (SAPs) that reflect the procedures and specifications presented in this procedure. Individual municipalities, county agencies, and possibly state regulatory agencies enforce regulations that may include well construction and installation requirements. The **Project Manager** shall be familiar with current local and state regulations, and ensure that these regulations are followed. The **Project Manager** is responsible for ensuring that all personnel involved in monitoring well installation shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Site Supervisor (SS)** is responsible for direct supervision of the installation of monitoring wells and ensuring that procedures and specifications are implemented in the field in accordance with the approved SAP and well installation permits. The qualifications for the **SS** must be in accordance with local jurisdictions with authority over the operations conducted.

5.2.4 All field personnel are responsible for the implementation of this procedure.

5.2.5 The on-site hydrogeologist/engineer is expected to obtain a description of the lithologic samples obtained during the excavation and construction of a monitoring well. These data are often required to provide guidance regarding the installation of specific components of the monitoring well. Guidance for lithologic sample collection and sample description is contained within SOP 3-16, Soil and Rock Classification.

6.0 Equipment and Supplies

6.1 Materials provided by the drilling contractor may include:

- Drill rig, drill rods, hollow stem augers, etc.
- Decontamination equipment (e.g., steam cleaner, high-pressure washer, brushes, etc.)
- Decontamination pad materials
- Well screen/riser pipe with flush-threaded couplings including riser and bottom caps
- Clean, filter sand
- Bentonite chips or pellets
- Cement grout and tremie pipe
- Portland cement for well pad completion
- Steel protective riser covers and locking caps
- Weighted calibrated tape
- Split-spoon samplers
- 55-gallon drums or containers for drill cuttings, decontamination fluids, etc.

6.2 In addition to those materials provided by the drilling contractor, equipment and materials required by the project geologist/engineer may include, but is not limited to, the following:

- Photoionization Detector (PID)
- Spill kit, including at a minimum sorbent pads and shovel (if not provided by subcontractor)

- Plastic sheeting
- Teaspoon or spatula
- Resealable plastic bags
- Boring Log Records
- Decontamination materials (per SOP No. 3-06 - Equipment Decontamination)
- Weighted measuring tape for depth measurement
- Soil logging materials (e.g. USCS classification field card, millimeter rule, hand lens, etc.)
- Survey lathes or pin flags
- Digital camera
- PPE as required by the APP/SSHP
- Planning documents including the site-specific APP/SSHP and SAP
- Large indelible ink or paint pen
- Field logbook/field forms/site maps (water proof)

7.0 Procedure

7.1 General Procedures

- Specific drilling, sampling, and installation equipment and methodology will be dictated by the type of well to be installed (e.g., single case (Type II), double case (Type III), bedrock, etc.), geologic characteristics of the site, the type of contaminants being monitored, and local and state regulations.
- For access to locations when travelling over difficult terrain, an appropriate line should be chosen before mobilizing the drill rig or other support vehicles. If clearing of trees or ground cover is required, perform these activities in advance to avoid down time. Avoid wet or soft areas where possible or use ground mats and/or timbers to aid in supporting the rig as it travels. If drilling on soft material, place geomatting and ground mats under the rig tracks or stabilizers prior to drilling.
- A utility locate must be conducted to identify all underground utilities at the site prior to drilling (refer to SOP 3-01, Utility Clearance*)*. Proper clearance procedures for aboveground/overhead utilities must also be followed as specified in the APP/SSHP.
- Although new well materials (well screen and riser pipe) generally arrive at the site boxed and sealed within plastic bags, it is sometimes necessary to decontaminate the materials prior to their use. Well materials should be inspected by the project geologist/engineer upon delivery to check for cleanliness. If the well materials appear dirty, or if local or regional regulatory guidance requires decontamination, then well material decontamination should be performed by the drilling subcontractor in accordance with SOP 3-06, Equipment Decontamination.
- The diameter of the borehole must be a minimum of 2 inches greater than the outside diameter of the well screen or riser pipe used to construct the well. This is necessary so that sufficient annular space is available to install filter packs, bentonite seals, and grout seals, and allow the passage of tremie pipe where grouting at depth is required. Bedrock wells may require reaming after coring in order to provide a large enough borehole diameter for well installation.
- When soil sampling is required (refer to the SAP), soil samples will be collected for visual logging by advancing split-spoon samplers through the augers. The soil will be visually logged by a field geologist and include lithologic characteristics (i.e., soil type, color, density, moisture content, etc.) using the the

methods described in SOP 3-16, Soil and Rock Classification. This information will be recorded on a boring/well log form, along with well construction details.

7.2 Drilling Techniques

Drilling of monitoring well boreholes may be accomplished by a variety of methods as described below. Preferred methods include those that temporarily case the borehole during drilling (i.e., hollow stem auger and sonic methods) using an override system. Other methods can be used where specific subsurface conditions or well design criteria dictate.

- Hollow stem auger (HSA) – Borings are advanced by rotating steel hollow stem augers with an attached cutting head. Soil cuttings are displaced by the cutting head and transported to the surface via continuous spiral flights attached to each auger stem. This method is widely used for unconsolidated soils that have a tendency to collapse within the boring. A bottom plug can be placed in the bottom auger to prevent soils from entering and clogging the auger, especially in the case of heaving sands. However, a bottom plug cannot be used when soil samples are to be collected through the augers. Soil plugs that accumulate in the bottom of the auger must be removed or knocked out prior to sampling or well installation.
- Solid stem auger – This type of drilling method is similar to HSA drilling using a solid stem or sealed hollow stem auger flights to advance the boring. Solid stem, continuous flight auger use is limited to semi-consolidated sediments or to cohesive or semi-cohesive unconsolidated sediments that don't have a tendency to collapse when disturbed.
- Sonic methods – Sonic drilling consists of advancing concentric hollow drill casings (inner and outer) using rotation in conjunction with axial vibration of the drill casing. Once the casings are advanced to the appropriate depth, the inner string is removed with a core of drill cuttings while the outer casing remains in place to keep the borehole open. Cuttings are removed from the inner casing relatively intact for logging or sampling purposes. This drilling method is used for a variety of soil types, from heaving sands to consolidated or indurated formations. Smearing of the formation along the borehole walls is minimal since moderate vibration and rotation techniques are used to advance the casings. Since the total borehole diameter in sonic drilling is only incrementally larger than the inner casing diameter, care should be taken during installation of the monitoring well to ensure the well is centered and adequate space is available for annular materials.
- Rotary methods (water or mud) – Rotary drilling methods consist of drill rods coupled to a drill bit that rotates and cuts through the soils to advance the borehole. Water or drilling fluid ("mud") is forced through the hollow drill rods and drill bit as the rods are rotated. The soil cuttings are forced up the borehole with the drilling fluids to the surface and the fluids recirculated. The drilling fluid provides a hydrostatic pressure that reduces or prevents the borehole from collapsing. Clean, potable water must be used for water-rotary drilling to prevent introducing trace contaminants. A sample of the potable water should be collected during the course of well installation for analysis of the same parameters defined for the groundwater samples. If mud-rotary is used to advance boreholes, potable water and bentonite drilling mud should only be used. No chemical additives shall be mixed in the drilling fluid to alter viscosity or lubricating properties. Adequate well development is essential for removal of drilling mud and fluids from the formation materials and ensure collection of representative groundwater samples.
- Rotary methods (Air) – Air rotary methods are similar to water rotary but use high air velocities in place of drilling fluids to rotate the drill bit and carry the soil cuttings up the borehole to the surface. Care must be taken to ensure that contaminants are not introduced into the air stream from compressor oils, etc. Most compressor systems are compatible with a coalescing filter system. Cuttings exiting the borehole under pressure must be controlled, especially when drilling in a zone of potential contamination. This can be accomplished by using an air diverter with hose or pipe to carry the cuttings to a waste container. Letting the cuttings blow uncontrolled from the borehole is not acceptable.

7.3 Well Construction and Installation

- If rotary drilling techniques are used, the borehole should be flushed or blown free of material prior to well installation. If hollow stem augers are used, the soil or bottom plug should be removed and the augers raised approximately six inches above the bottom of the borehole, while slowly rotating the augers to remove cuttings from the bottom of the boring. The depth of the borehole should be confirmed with a weighted, calibrated tape.
- The riser pipe and screen should be connected with flush-threaded joints and assembled wearing clean, disposable gloves. No solvent or anti-seize compound should be used on the connections. The full length of the slotted portion of the well screen and unslotted riser pipe should be measured and these measurements recorded on a well construction form (Attachment 1).
- If placed in an open borehole, the assembled well should be carefully lowered and centered in the borehole so that the well is true, straight, and vertical throughout. Centering can also be accomplished with the use of centralizers, if necessary. However, centralizers should be placed so that they do not inhibit the installation of filter sand, bentonite seal, and annular grout. Wells less than 50 deep generally do not require centralizers.
- If hollow stem augers are used, the well should be lowered through the augers and each auger flight removed incrementally as the filter sand, bentonite seal, and grout are tremmied or poured into the annular space of the well. The well should be temporarily capped before filter sand and other annular materials are installed.
- Clean, silica sand should be placed around the well screen to at least 1 foot above the top of the screen. The filter sand should be appropriately graded and compatible with the selected screen size and surrounding formation materials. In general, the filter pack should not extend more than 3 feet above the top of the screen to limit the thickness of the monitoring zone. As the filter pack is placed, a weighted tape should be lowered in the annular space to verify the depth to the top of the layer. This measurement will be recorded on the well construction form (Attachment 1). If necessary, to eliminate possible bridging or creation of voids, placement of the sand pack may require the use of a tremie pipe. Tremie pipe sandpack installations are generally suggested for deeper wells and for wells which are screened some distance beneath the water table.
- A minimum 2-foot thick layer of bentonite pellets or slurry seal will be installed immediately above the filter sand to prevent vertical flow within the boring from affecting the screened interval. Bentonite chips/pellets must be hydrated if place above the water table prior to grouting. If bridging is of concern as in the case of deep wells, powdered bentonite may be mixed with water into a very thick slurry and a tremie pipe used to place the seal to the desired depth. Placement of the bentonite seal in the borehole will be recorded on the well construction form (Attachment 1).
- The remaining annular space around the well will be grouted from the top of the bentonite seal to the surface with a grout composed of neat cement, a bentonite cement mixture, or high solids sodium bentonite grout.
- Each well riser will be secured with an expandable, locking cap (vented if possible). Optionally, a hole can be drilled in the upper portion of the riser to allow venting of the well.
- The well will be completed within a concrete well pad consisting of a Portland cement/sand mixture. Well pads are generally 3 feet by 3 feet square but may be larger or smaller depending on site conditions and state-specific well construction standards. Round concrete well pads are also acceptable. A minimum of 1 inch of the finished pad should be below grade to prevent washing and undermining by soil erosion.
- If completed as a flush-mount well, the well riser will be cut off approximately 4 to 6 inches below ground surface and an expandable, locking cap placed on the well riser. The area around the riser is dug out and a steel well vault or manhole cover placed over the riser and set almost flush to the ground

to protect the well. The manhole cover should be water-tight and secured with bolts to prevent casual access. The well pad will then be constructed around the well vault and slightly mounded at the center and sloping away to prevent surface water from accumulating in the well vault.

- If completed as a stick-up well, the well riser is cut approximately 2.5 to 3 feet above the ground surface and an expandable, locking cap placed on the well riser. A steel guard pipe with hinged, locking cap is placed over the well riser as a protective casing. The bottom of the guard pipe will be set approximately 2 feet below ground surface and sealed by pouring concrete from the top of the annular grout around the pipe to grade. The concrete well pad should be completed at the same time. Weep holes will be drilled in the base of the guard pipe to facilitate draining of rainwater or purge water from inside the guard pipe.
- Bumper posts or bollards may be necessary for additional well protection, especially in high traffic areas. The bumper posts should be placed around the well pad in a configuration that provides maximum protection to the well and extend a minimum of 3 feet above the ground.

7.4 Double Cased Wells

Under certain site conditions, the use of a double-cased or telescoping (Type III) well may be necessary. Installation of double-cased wells may be required to prevent the interconnection of two separate aquifers, seal off a perched aquifer without creating a vertical hydraulic conduit, prevent cross-contamination during construction of wells in deeper aquifers hydro-stratigraphically below impacted aquifers, or case off highly impacted soils present above the aquifer to prevent potential “dragging down” of contaminants.

Similar to conventional wells, construction of double-cased wells can be accomplished using a varety of drilling methods. Well construction is initiated by “keying” a large diameter, outer casing into a stratigraphic zone of low permeability (clay layer or bedrock). The size of the outer casing should be a minimum of 2 inches greater than the outside diameter of the inner casing to allow installation of annular seal materials during well completion. A pilot borehole should be drilled through the overburden soil and/or contaminated zone into a clay confining layer or bedrock. The borehole for the outer casing should be of sufficient size to contain the outer casing with a minimum of 2 inches around the outside diameter to allow sufficient annular space for tremie or pressure grouting. The boring should extend a minimum of 2 feet into a clay layer and a minimum of 1 foot into bedrock, if possible, to ensure an adequate seal. The boring should never breach a confining layer or keyed zone under any circumstances.

Once the boring is completed, the outer casing can be set in the borehole and sealed with grout. The outer casing can be set two ways, with or without a bottom cap. If no bottom cap is applied, the casing is usually driven approximately 6 inches into the clay confining unit. A grout plug is generally placed in the bottom of the casing and once set, standing water in the casing is evacuated prior to drilling below the casing. As an alternative, a cap can be placed on the bottom of the casing and if set below the water table, the casing can be filled with clean, potable water to hold down the casing in the boring. Grouting should be conducted using tremie-grouting or pressure-grouting methods by pumping grout into the annular space between the outer casing and the borehole wall from the bottom of the casing to the ground surface. Grout around the casing should be allowed to cure at least 24 hours before attempting to drill through the bottom.

Once the grout is cured, a smaller diameter drill pipe/bit is used to bore through the grout plug or bottom cap to the desired well depth. The well is then constructed as described in Section 7.3 above.

7.5 Post Installation Procedures

- Wells should be permanently labelled or marked for identification. Well tags can be used to record the site name, well number, total depth, installation date, etc. At a minimum, the well number will be written in indelible marker or paint on both the outside of the protective casing and inside beneath the casing lid, as well as on the riser pipe.

- A measuring point will be marked on the top of the riser pipe for taking water level measurements. The measuring point can be notched using a knife or saw or can be marked with a waterproof marker or paint. The measuring point will also be the point which will be surveyed for vertical elevation data.
- Upon completion, the following measurements will be taken by the field geologist/engineer and recorded on the well construction diagram.
    - Depth to static water level
    - Depth of non-aqueous phase liquid (NAPL), if present
    - Total depth of well measured from top of casing (TOC)
    - Height of well casing above ground surface
    - Height of protective casing above ground surface
- All monitoring wells will be surveyed for horizontal and vertical control by a licensed surveyor.
- Investigation-derived waste (IDW) including drill cuttings, spent materials (e.g., PPE), and decontamination water should be properly managed in accordance with SOP 3-05, IDW Management.

8.0 Quality Control and Assurance

8.1 Field personnel will follow specific quality assurance (QA) guidelines as outlined in the SAP. Certain quality control (QC) measures should be taken to ensure proper well installation and construction in accordance with this SOP, project specific SAP, and applicable well standards.

8.2 The borehole will be checked for total open depth, and extended by further drilling or shortened by backfilling, as required before installation of the well materials.

8.3 Water level and NAPL presence will be checked during well installation to ensure that the positions of well screen, filter sand, and seals relative to water level conform to project requirements

8.4 The depth to top of each layer of annular materials (i.e., filter sand, bentonite, grout) will be verified and adjusted as necessary for proper placement.

9.0 Records, Data Analysis, Calculations

All field information will be recorded in the field logbook and/or standardized field forms by field personnel. Field data recorded will include drilling contractor information, drilling methods, well material and construction information provided on the boring logs and well construction forms, observations or problems encountered during drilling, fluid level data, and any deviations from the procedures in this SOP and other project plans. Well Construction Forms (Attachment 1) will provide visual and descriptive information the monitoring well and are often the most critical form of documentation generated during the installation of a monitoring well. The field logbook is kept as a general log of activities and should not be used in place of the boring log.

10.0 Attachments or References

10.1 Attachment 1 – Monitoring Well Construction Form

10.2 Environmental Protection Agency, United States (EPA). 1987. *A Compendium of Superfund Field Operations Methods*. Office of Solid Waste and Emergency Response. EPA/540/P-87/001.

10.3 EPA. 1990. *Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells*. EPA/600/4-89/034. Office of Research and Development, Washington. March.

10.4 EPA. 1992. *RCRA Groundwater Monitoring Draft Technical Guidance*. EPA/530/R-93/001. Office of Solid Waste. November.

10.5 EPA, 2008. SESD Operating Procedure SESDGUID-101-R0: *Design and Installation of Monitoring Wells*. USEPA, Science and Ecosystem Support Division (SESD), Athens, Georgia. Effective Date February 18, 2008.

10.6 U.S. Army Corps of Engineers. 2008. Manual No. EM 385-1-1. *Safety and Health Requirements*. 15 November 2008. http://140.194.76.129/publications/eng-manuals/em385-1-1/2008_English/toc.html.

10.7 SOP 3-01, *Utility Clearance*.

10.8 SOP 3-05, *IDW Management*

10.9 SOP 3-06, *Equipment Decontamination*.

10.10 SOP 3-16, *Soil and Rock Classification.*

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

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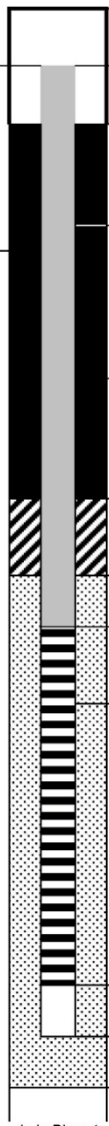
Attachment 1
Monitoring Well Construction Form

	Client:	***WELL ID:***
	Project Number:	
	Site Location:	*Date installed:*
	Well Location: *Coords:*	*Inspector:*
	Method:	*Contractor:*

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum ________
Top of Steel Guard Pipe	________	________
Top of Riser Pipe	________	________
Ground Surface (G.S.)	0.0	________
Top of Bentonite	________	________
Top of Sand	________	________
Top of Screen	________	________
▼ Stabilized Water Level	________	________
Bottom of Screen	________	________
Bottom of Tail Pipe:	________	________
Bottom of Borehole	________	________

Measuring Point for Surveying & Water Levels

Cement, Bentonite, Bentonite Slurry Grout, or Native Materials

____ % Cement

____ % Bentonite

____ % Native Materials

Riser Pipe:
- Length ________
- Inside Diameter (ID) ________
- Type of Material ________

Bottom of Steel Guard Pipe

Bentonite Seal Thickness ________

Screen:
- Length ________
- Inside Diameter (ID) ________
- Slot Size ________
- Type of Material ________

Type/Size of sand ________

Sand Pack Thickness ________

Bottom of Tail Pipe:
- Length ________

Borehole Diameter ______

Approved:

Describe Measuring Point:

____

Signature ________ Date ________

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Boring Log

Project Name: Camp Hero Remedial Investigation	Site:	**Hole ID:**
Project Number: 60443903.4.1	*Northing:*	Total Depth (feet):
Drilling Contractor: New England Geotech	*Easting:*	Date / Time Started:
Driller:	Elevation (feet MSL): *Ground:*	Date / Time Finished:
Drilling Equipment:	▼ Water Depth During Drilling (feet bgs):	Date / Time Completed:
Drilling Method:	Logged By:	Checked By:
Borehole Diameter (inches):	Weather/Comments:	

Depth (feet)	USCS Description	Log: Graphic	Log: USCS or Rock Type	Samples: Attempted Recovered	Samples: Method	Samples: Run Number	Samples: PID/FID (ppm)	Samples: Time	Well Diagram	Remarks (list sample numbers here)
										Soil Sample Info SB S#: SD: ST: Analyses:
5										SB S#: SD: ST: Analyses:
10										**Groundwater Sample Info** Well-head PID (ppm): DTW (ft bgs): GW S#: Screen interval (ft bgs): ST: Analyses: Temp (C): pH: SC (mS/cm): ORP (mV): DO (mg/L): Turbidity (NTU):
15										

Tracking Codes: 10/19/12, 12:21

USCS Name, **Consistency/Density** (predominantly fine: very soft {n=0-1}, soft {n=2-4}, medium stiff {n=5-8}, stiff {n=9-15}, very stiff {n=16-30}, hard {n=31+}/predominently coarse: very loose {n=0-4}, loose {n=5-10}, medium dense {n=11-30}, dense {n=31-50}, very dense {n=51+}). **Moisture**, (dry, moist, wet). **Color**. **Gradation** (relative percentages of soil components). **Plasticity/Cohesiveness** (predominently fine: nonplastic, slightly plastic, low plasticity, medium plasticity, high plasticity)/predominently coarse: cohesionless, slightly cohesive, cohesive). **Stratification/Structure** (blocky, massive, lensed, etc) (contacts: sharp, gradational) (bedding: horizontal, inclined). **Cementation** (none, weak, moderate, strong). **Other descriptive elements; Geologic Origin**
S# = Sample Number, **SD** = Sample Depth, **ST** = Sample Time, **A** = Analysis.
BZ = Breathing Zone, **BG** = Background, **BH** = Borehole, **CB** = Cuttings Bin

Boring Log
(Continued)

Project Name: Camp Hero Remedial Investigation		Site:								Hole ID:	
Depth (feet)	USCS Description	Log		Samples						Well Diagram	Remarks (list sample numbers here)
		Graphic	USCS or Rock Type	Attempted Recovered	Method	Run Number	PID/FID (ppm)	Time			
20											
25											
30											

Tracking Codes: 10/19/12, 12:20

Form: 00-BLANK LOG

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Monitoring Well Development

Procedure 3-13

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the procedures used for developing newly installed monitoring wells and/or redeveloping existing wells.

1.2 The purpose of well development is to remove interferences from a well to provide better connection between the well and the formation, to improve pumping performance of the well, and to be able to collect more representative information from the well (e.g., samples, test results, etc.). Proper well development will:

- Remove drilling residuals (e.g., water, mud) from the borehole and surrounding formations;
- Improve or restore hydraulic conductivity of the surrounding formations which may have been disturbed during the drilling process;
- Remove residual fines from the well screen and sand pack (filter pack) materials, thus reducing turbidity of groundwater and permitting the collection of more representative groundwater samples.

1.3 There may be circumstances where well development is not desirable, for example, in the presence of non-aqueous phase liquids (NAPL) or other significant contamination if development could worsen the contaminant impact. If NAPL begins to intrude during development, the development process will be halted. This situation will be considered a cause for sample modification requiring approval by the Project Manager and other stakeholders, as applicable.

1.4 The applicable well development procedures for a particular site may be subject to State or local regulatory requirements. In all cases, the project team should consult their local regulatory requirements and document the selected well development procedure in the project-specific Sampling and Analysis Plan (SAP). For project-specific information refer to the Work Plan (WP) and Sampling and Analysis Plan (SAP), which takes precedence over these procedures.

1.5 This procedure is the professional guidance for work performed by AECOM under contract to the United States Army Corp of Engineers (USACE).

1.6 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project-specific Accident Precention Plan (APP) and Site Safety and Health Plan (SSHP). In the absence of a APP/SSHP, work will be conducted according to the project-specific WP, SAP, and/or direction from the Site Safety and Health Officer (SSHO).

2.2 Monitoring well development may involve chemical hazards associated with potential contaminants in the soil or aquifer being characterized and may involve physical hazards associated with use of well development equipment.

3.0 Terms and Definitions

None.

4.0 Interferences

4.1 Equipment/materials used for development may react with the groundwater during development. Appropriate development equipment has been selected for the anticipated condition of the groundwater.

4.2 Appropriate development methods such as using a surge-block to flush suspended fines in the groundwater in and out of the well screen can improve the yield of wells and improve their potential to be developed successfully. However, the effectiveness of development can be significantly reduced in wells that do not yield sufficient water to allow this flushing to take place.

4.3 For formations with a significant content of fine-grained materials (silts and clays), or wells with improperly sized screens, it may not be possible to reduce turbidity to commonly acceptable levels. Possible solutions may include collecting a sample even if excessively turbid, or installing a replacement well.

4.4 Development itself disturbs the surrounding formation and disrupts equilibrium conditions within the well. Groundwater samples will not be collected until a minimum of 24 hours after a well is developed to allow conditions to stabilize. For sites with fine-grained formations (silts and clays) and highly sorptive contamination, a longer time period between development and sampling should be considered.

5.0 Training and Qualifications

5.1 Qualifications and Training

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The **Project Manager** is responsible for ensuring that well development activities comply with this procedure. The **Project Manager** is responsible for ensuring that all personnel involved in well development shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Site Supervisor** is responsible for ensuring that all well development activities are conducted according to the either this procedure or the applicable procedure presented in the project-specific SAP.

5.2.4 **Field sampling personnel** are responsible for the implementation of this procedure.

5.2.5 The field sampler and/or task manager is responsible for directly supervising the well development procedures to ensure that they are conducted according to this procedure and for recording all pertinent data collected during sampling.

6.0 Equipment and Supplies

6.1 This equipment list was developed to aid in field organization and should be used in planning and preparation. Depending on the site-specific requirements and the development method selected, additional or alternative material and equipment may be necessary. In addition, for sites where groundwater is expected to be contaminated, the materials to be placed down the well and in contact with groundwater should be evaluated so that they are compatible with the chemical conditions expected in the well.

6.2 Equipment and materials used for well development may include, but is not limited to:

Well development equipment

- Surge block

- Disposable Teflon bailers, appropriate to the diameter of the well(s): 1-inch to 1.5-inch for 2-inch inside diameter (ID) monitoring wells.
- Watterra® footvalve
- Electric submersible pump
- 12-volt power source for electric pump
- High density polyethylene (HDPE) tubing appropriately sized for Watterra® footvalve and/or electric submersible pump
- Drums or containers for storage of purge water
- Nephelometer to measure turbidity
- Multi-parameter water quality meter(s) to measure temperature, pH, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP)
- Instrument calibration solutions
- Water level meter
- Oil/water interface probe

General equipment

- Project-specific plans including the site-specific HASP and SAP
- Field notebook/field forms/site maps
- Indelible markers/pens
- 5-gallon buckets

Equipment decontamination supplies (refer to SOP 3-06, Equipment Decontamination)

- Health and safety supplies, including personal protective equipment (PPE)
- Appropriate hand tools
- Keys or combinations to access monitoring wells
- Distilled/deionized water supply
- Disposable bailer string (polypropylene)
- Plastic trash bags

7.0 Procedure

Development generally consists of removing water and entrained sediment from the well until the water is clear (to the extent feasible) and the turbidity is reduced, which indicates the well is in good hydraulic connection with the surrounding formation. In addition to simply removing water, development can be improved when flushing through the well screen and gravel pack takes place in both directions, that is, both into the well and into the formation. This action breaks down sediment bridges that can occur in the formation or sand pack, which reduce the connection between the well and the formation

7.1 General Preparation

- All down-well equipment should be decontaminated prior to use and between well locations in accordance with SOP 3-06, Equipment Decontamination
- Although equipment is decontaminated between well locations, if wells are known or suspected to be contaminated based on observations during well installation, it is recommended that well development be conducted in order from the least contaminated to the most contaminated well to minimize the chances of cross-contamination.
- Management of investigation-derived waste (IDW), including development purge water and miscellaneous expendable materials generated during the development process, will be conducted in accordance with SOP 3-05, IDW Management.

- Prior to accessing the well, the wellhead should be cleared of debris and/or standing water. Nothing from the ground surface should be allowed to enter the well.
- The depth to water and total well depth should be measured with a water level meter and recorded in the field logbook or on a Well Development Record (Attachment 1). This information will be used to calculate the volume of standing water (i.e., the well volume) within the well, and plan the specific details of the well development. If wells are suspected to contain NAPL, an oil/water interface probe should be used to measure liquid levels and depth to bottom of the well.
- Permanent monitoring wells will be developed no sooner than 24 hours after well installation is completed in order to allow well completion materials to set properly.

7.2 Monitoring Well Development Procedures

Generally, development will begin by gently surging the well with a surge block or bailer as described in Sections 7.2.1 and 7.2.2, respectively. Surging can become more vigorous as development progresses but initially the well must be gently surged to allow material blocking the screen to become suspended without damaging the well. Next, a bailer can be used to remove the sediment settled at the base of the well. A bailer, Watterra® pump, or electric submersible pump will then be used to purge the well, per Sections 7.2.2, 7.2.3, or 7.2.4, respectively. The well will be purged until the removed water becomes less turbid or per the requirements of the project-specific SAP, or State or local requirements. At this point the well will be surged again with a surge block or bailer. The well can be surged more vigorously at this point. After surging, the well will be purged again until the turbidity once again decreases. The surge/purge cycle should be completed at least three times during the development process. After the last surge, the well will be purged until the development completion criteria outlined in 7.3.2 or per the project-specific SAP are met.

7.2.1 Surge Block

The default method of well development is the use of a surge block in conjunction with pumping or bailing to remove sediment-laden water.

- The construction of the surge block must be appropriate for the diameter of the well. The surge block must be mounted on rods or other stiff materials to extend it to the appropriate depths and to allow for the surge block to be moved up and down in the well.
- Insert the surge block into the well and lower it slowly to the screened or open interval below the static water level. Start the surge action by slowly and gently moving the surge block up and down in the well. A slow initial surging, using plunger strokes of approximately 1 meter or 3 feet, will allow material which is blocking the screen to separate and become suspended.
- After 5 to 10 plunger strokes, remove water from the well using a separate bailer (Section 7.2.2) or pumping techniques (Sections 7.2.3 or 7.2.4). The returned water should be heavily laden with suspended fines. The water will be discharged to 5-gallon buckets or 55-gallon drums to be managed per the requirements presented in the project-specific SAP.
- In some cases, the bailer or Watterra® foot valve can act as a surge block, flushing water in and out of the well screen as groundwater is removed.
- Repeat the process of surging and pumping/bailing. As development continues, slowly increase the depth of surging to the bottom of the well screen. Surging within the riser portion of the well is neither necessary nor effective.

7.2.2 Bailer

- Tie a string or other cable securely to the bailer. Lower it to the screened or open interval of the monitoring well below the static water level.
- The bailer may be raised and lowered repeatedly within the screened interval to attempt to simulate the action of a surge block by pulling fines through the well screen, and pushing water out into the formation to break down bridging.

- With the bailer full of water, remove it from the well and discharge the water into 5-gallon buckets or 55-gallon drums to be managed per the requirements presented in the project-specific SAP.
- The Watterra® system (Section 7.2.3) or electric submersible pump (Section 7.2.4) may be used as a complementary development method to the bailer, especially when removal of additional water at a faster rate is beneficial.
- Continue alternately surging and bailing, monitoring the purge water periodically (Section 7.3.1) until development completion criteria are met (Section 7.3.2).

7.2.3 Watterra® system

- Attach high-density polyethylene (HDPE) tubing to the decontaminated Watterra® pump foot valve
- Lower the foot valve and tubing assembly near the bottom of the well.
- Lift and lower the tubing to allow water to enter the Watterra® foot valve and travel up the tubing and discharge the water into 5-gallon buckets or 55-gallon drums to be managed per the requirements presented in the project-specific SAP.
- The lifting and lowering action of the Watterra® sysem will cause some surging action to aid in breaking up fine material in the surrounding formation.
- A bailer (Section 7.2.2) may be used as a complementary development method to the Watterra® system, especially during the initial stages of development when a high volume of sediment may be required to be removed.
- An electric submersible pump (Section 7.2.4) may also be used as a complementary development method to the Watterra® system, especially when more volume of water is desired to be pumped or the turbidity criteria cannot be met due to the surging action of the Watterra® system.
- Continue alternately surging and pumping, monitoring the purge water periodically (Section 7.3.1) until well development completion criteria are met (Section 7.3.2).

7.2.4 Electric Submersible Pump

- Attach HDPE tubing to the decontaminated electric submersible pump.
- Lower the pump and tubing assembly near the bottom of the well, at least a few inches above the well total depth.
- Begin pumping, discharging the water into 5-gallon buckets or 55-gallon drums to be managed per the requirements presented in the project-specific SAP.
- Continue alternately surging and pumping, monitoring the purge water discharge periodically (Section 7.3.1) until well development completion criteria are met (Section 7.3.2).

7.3 Discharge Monitoring

7.3.1 Monitoring the Progress of Development

The progress of the development is evaluated through visual observation of the suspended sediment load and measurement of the turbidity and other parameters in the purged diischarge water. As development progresses, the water should become clearer, measured turbidity should decrease, and specific capacity (pumping rate divided by drawdown) should stabilize. Water quality parameters, including DO, conductivity, ORP, pH, temperature, and turbidity may be measured and recorded periodically to determine the progress of development using the criteria outlined in Section 7.3.2 or per the project-specific SAP. Water quality parameters should be measured on each well volume removed.

7.3.2 Completion of Development

The well will be considered developed when the following criteria are met or per the criteria set forth in the project-specific SAP:

- A minimum of three times the standing water volume in a well (to include the well screen and casing plus saturated annulus, assuming 30 percent porosity) is removed.

- Groundwater parameters for three consecutive standing water volumes are within the following:
    - pH – within ± 0.2 units
    - Specific conductivity – within ± 3%
    - ORP – within ± 10 mV
    - Temperature – within ±1 degree Celsius
    - Turbidity – at or below 10 nephelometric turbidity units (NTU) or within ± 10% if above 10 NTU.
- The sediment thickness remaining within the well is less than 1 percent of the screen length or less than 30 millimeters (0.1 ft) for screens equal to or less than 10 feet long.

Dissolved oxygen (DO) readings may be recorded but DO readings will not be used as development completion criteria because DO may not stabilize.

If the well has slow groundwater recharge and is purged dry, the well will be considered developed when bailed or pumped dry three times in succession and the turbidity has decreased, or per the requirements set forth in the project-specific SAP. Water quality parameters may be recorded if feasible using the flow-through cell.

If any water is added to the well's borehole during development or drilling, three times the volume of water added will also be removed during well development, or per the requirements set forth in the project-specific SAP.

7.4 Development of Wells with Low Yield

Water is the primary mechanism to remove fines and flush water through the gravel pack for effective development. Therefore, development can be a challenge in wells that do not yield sufficient water to recharge when water is removed. However, often these wells are the most in need of development to improve their performance as they are typically installed in low permeability formations with a high content of fines. Development of these wells can improve their yield.

The surging portion of the development can be successfully performed in a well with standing water regardless of its yield. It is the subsequent removal of fine materials that is hindered when insufficient water is recharged to the well. When wells go dry or drawdown significantly during development, development can be performed intermittently, allowing sufficient water to recharge prior conducting the next stage of surging. These intermittent procedures can take place hours or even days apart, depending on project-specific time constraints.

7.5 Wells containing NAPL

Additional care should be taken when planning development of wells that contain NAPL. If the NAPL is flammable, there are health and safety as well as handling issues to consider. If NAPL in excess of a persistent sheen is noted, the recharge rate will be evaluated through hand bailing. In most cases, it is generally preferable to remove NAPL by bailing to the extent practical prior to performing development. Groundwater parameters, excluding turbidity, will not be collected during well development if NAPL or excessive sheen is noticed in the purged water during development to ensure the meter probes are not fouled or destroyed. Well development will be halted.

Development by surging or pumping the well dry can result in the spreading of NAPL vertically in the soil column around the well. These methods can be used, if information exists describing the vertical thickness of the NAPL smear zone around the well, and if the methods do not result in mounding or drawdown that exceeds this thickness. Alternate methods such as bailing may also be used, but any method should not allow the well to be pumped dry or result in significant drawdown that would spread the NAPL vertically.

7.6 Temporary Well Points

For certain projects, temporary well points (TWPs) may be installed to collect groundwater samples at a site. Since no sand pack, bentonite chips, or bentonite grout are generally used in the construction of the TWPs, development can proceed as soon as sufficient water has entered the well to static conditions. Due to the small diameter of these wells, generally ¾-inch to 1-inch ID, development will be performed using either a small diameter (0.5-inch) bailer and/or a peristaltic pump with dedicated tubing. The TWPs will have minimal water column and may purge dry during development. However, attempts will be made to remove fines from the well prior to sampling. Purging and sampling may occur as soon as approximately 80% of the static water has re-entered the TWP, or per the requirements set forth in the project-specific SAP.

8.0 Quality Control and Assurance

8.1 Field personnel will follow specific quality assurance (QA) guidelines as outlined in the project-specific SAP.

8.2 Quality control (QC) requirements are dependent on project-specific sampling objectives. The project-specific SAP will provide requirements for equipment decontamination (frequency and materials) and IDW handling.

9.0 Records, Data Analysis, Calculations

9.1 All data and information (e.g., development method used) must be documented on field data sheets (Attachment 1) or within site logbooks with permanent ink. Data recorded may include the following:

- Well Location
- Weather conditions
- Date and Time
- Purge Method
- Reading/measurements obtained

10.0 Attachments or References

Attachment 1 – Well Development Record

SOP 3-05, *IDW Management*.

SOP 3-06, *Equipment Decontamination*.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Shawn Dolan Senior Scientist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (June 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change o nly; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Attachment 1
Well Development Record

Well/Piezometer Development Record

Well ID:

Client: ____________

Project No: ____________ Date: ________ Developer: ____________

Site Location: ____________

Well/Piezometer Data

Well ☐ Piezometer ☐ Diameter ________ Material ________

Measuring Point Description ________

Depth to Top of Screen (ft.) ________

Depth to Bottom of Screen (ft.) ________

Total Well Depth (ft.) ________

Depth to Static Water Level (ft.) ________

Geology at Screen Interval (if known) ________

Time of Water Level Measurement ________

Calculate Purge Volume (gal.) ________

Disposal Method ________

Headspace ________

Original Well Development ☐ Redevelopment ☐ Date of Original Development ________

DEVELOPMENT METHOD ____________

PURGE METHOD ____________

Time	Total Volume Purged (gal.)	Flow Rate (gpm)	Turbidity (NTU)	Color	pH	Temp	Other

ACCEPTANCE CRITERIA (from workplan)

Minimum Purge Volume Required _____ gallons
Maximum Turbidity Allowed _____ NTUs
Stabilization of parameters _____%

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Has parameters stabilized	☐	☐	☐

If no or N/A explain below:

____

Signature ____________ Date: ________

AECOM

Monitoring Well Sampling

Procedure 3-14

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the actions to be used during monitoring well sampling activities and establishes the method for sampling groundwater monitoring wells for water-borne contaminants and general groundwater chemistry. The objective is to obtain groundwater samples that are representative of aquifer conditions with as little alteration to water chemistry as possible.

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM under contract to the United States Army Corp of Engineers (USACE).

1.3 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 Depending upon the site-specific contaminants, various protective programs must be implemented prior to sampling the first well. All field sampling personnel responsible for sampling activities must review the project-specific Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP), paying particular attention to the control measures planned for the well sampling tasks. Conduct preliminary area monitoring of sampling wells to determine the potential hazard to field sampling personnel. If significant contamination is observed, minimize contact with potential contaminants in both the vapor phase and liquid matrix through the use of of appropriate personal protective equipment (PPE).

2.2 Observe standard health and safety practices according to the project-specific APP/SSHP. Suggested minimum protection during well sampling activities includes inner disposable vinyl gloves, outer chemical-protective nitrile gloves and rubberized steel-toed boots. Half-face respirators and cartridges and Tyvek® suits may be necessary depending on the contaminant concentrations. Refer to the project-specific APP/SSHP for the required PPE.

2.3 Physical Hazards associated with Well Sampling

- To avoid lifting injuries associated with pump and bailers retrieval, use the large muscles of the legs, not the back.
- Stay clear of all moving equipment, and avoid wearing loose fitting clothing.
- When using tools for cutting purposes, cut away from yourself. The use of appropriate, task specific cutting tools is recommended.
- To avoid slip/trip/fall conditions as a result of pump discharge, use textured boots/boot cover bottoms.
- To avoid heat/cold stress as a result of exposure to extreme temperatures and PPE, drink electrolyte replacement fluids (1 to 2 cups per hour is recommended) and, in cases of extreme cold, wear fitted insulating clothing.
- Be aware of restricted mobility due to PPE.

3.0 Terms and Definitions

None.

4.0 Interferences

4.1 Potential interferences could result from cross-contamination between samples or sample locations. Minimization of the cross-contamination will occur through the following:

- The use of clean sampling tools at each location as necessary.
- Avoidance of material that is not representative of the media to be sampled.

5.0 Training and Qualifications

5.1 **Qualifications and Training**

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 **Responsibilities**

5.2.1 The **Project Manager** is responsible for ensuring that monitoring well sampling activities comply with this procedure. The **Project Manager** is responsible for ensuring that all field sampling personnel involved in monitoring well sampling shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Site Supervisor (SS)** is responsible for ensuring that all field sampling personnel follow these procedures.

5.2.4 **Field sampling personnel** are responsible for the implementation of this procedure.

5.2.5 The field sampler and/or task manager is responsible for directly supervising the groundwater sampling procedures to ensure that they are conducted according to this procedure and for recording all pertinent data collected during sampling.

6.0 Equipment and Supplies

6.1 Purging and Sampling Equipment

- Pump (Peristaltic, Portable Bladder, Submersible)
- Polyethylene or Teflon bladders (for portable bladder pumps)
- Bladder pump controller (for portable bladder pumps)
- Air compressor (for portable bladder pumps)
- Nitrogen cylinders (for portable bladder pumps)
- 12-volt power source
- Polyethylene inlet and discharge tubing (except for VOC analysis which requires Teflon tubing)
- Silicone tubing appropriate for peristaltic pump head
- Teflon bailer appropriately sized for well

- Disposable bailer string (polypropylene)
- Individual or multi-parameter water quality meter(s) with flow-through cell to measure temperature, pH, specific conductance, dissolved oxygen (DO), oxidation reduction potential (ORP), and/or turbidity
- Turbidity meter
- Water level meter
- Oil/water interface probe

6.2 General Equipment

- Sample kit (i.e., bottles, labels, preservatives, custody records and tape, cooler, ice)
- Sample Chain-of-Custody (COC) forms
- Sample Collection Records
- Sample packaging and shipping supplies
- Waterproof marker or paint
- Distilled/deionized water supply
- Water dispenser bottles
- Flow measurement cup or bucket
- 5-gallon buckets
- Instrument calibration solutions
- Stopwatch or watch
- Disposable Nitrile gloves
- Paper towels
- Trash bags
- Zipper-lock bags
- Equipment decontamination supplies
- Health and safety supplies (as required by the APP/SSHP)
- Approved plans such as: project-specific APP/SSHP and SAP
- Well keys or combinations
- Monitoring well location map(s)
- Field project logbook/pen

7.0 Calibration or Standardization

7.1 Field instruments will be calibrated daily according to the requirements of the SAP and manufacturer's specifications for each piece of equipment. Equipment will be checked daily with the calibration solutions at the end of use of the equipment. Calibration records shall be recorded in the field logbook or appropriate field form.

7.2 If readings are suspected to be inaccurate, the equipment shall be checked with the calibration solutions and/or re-calibrated.

8.0 Procedure

8.1 Preparation

8.1.1 Site Background Information

Establish a thorough understanding of the purposes of the sampling event prior to field activities. Conduct a review of all available data obtained from the site and pertinent to the water sampling. Review well history data including, but not limited to, well locations, sampling history, purging rates, turbidity problems, previously used purging methods, well installation methods, well completion records, well development methods, previous analytical results, presence of an immiscible phase, historical water levels, and general hydrogeologic conditions.

Previous groundwater development and sampling logs give a good indication of well purging rates and the types of problems that might be encountered during sampling, such as excessive turbidity and low well yield. They may also indicate where dedicated pumps are placed in the water column. To help minimize the potential for cross-contamination, well purging and sampling and water level measurement collection shall proceed from the least contaminated to the most contaminated well as indicated by previous analytical results. This order may be changed in the field if conditions warrant it, particularly if dedicated sampling equipment is used. A review of prior sampling procedures and results may also identify which purging and sampling techniques are appropriate for the parameters to be tested under a given set of field conditions.

8.1.2 Groundwater Analysis Selection

Establish the requisite field and laboratory analyses prior to water sampling. Decide on the types and numbers of quality assurance/quality control (QA/QC) samples to be collected (refer to the project-specific SAP), as well as the type and volume of sample preservatives, the type and number of sample containers, the number of coolers required, and the quantity of ice or other chilling materials. The field sampling personnel shall ensure that the appropriate number and size sample containers are brought to the site, including extras in case of breakage or unexpected field conditions. Refer to the project-specific SAP for the project analytical requirements.

8.2 Groundwater Sampling Procedures

Groundwater sampling procedures at a site shall include:

1) An evaluation of the well security and condition prior to sampling;
2) Decontamination of equipment;
3) Measurement of well depth to groundwater;
4) Assessment of the presence or absence of an immiscible phase;
5) Assessment of purge parameter stabilization;
6) Purging of static water within the well and well bore; and
7) Obtaining a groundwater sample.

Each step is discussed in sequence below. Depending upon specific field conditions, additional steps may be necessary. As a rule, at least 24 hours should separate well development and well sampling events. In all cases, consult the State and local regulations for the site, which may require more stringent time separation between well development and sampling.

8.2.1 Well Security and Condition

At each monitoring well location, observe the conditions of the well and surrounding area. The following information may be noted on a Groundwater Sample Collection Record (Attachment 1) or in the field logbook:

- Condition of the well's identification marker.
- Condition of the well lock and associated locking cap.
- Integrity of the well – well pad condition, protective outer casing, obstructions or kinks in the well casing, presence of water in the annular space, and the top of the interior casing.
- Condition of the general area surrounding the well.

8.2.2 Decontamination of Equipment

Where possible, dedicated supplies should be used at each well location to minimize the potential for cross-contamination and minimize the amount of investigation derived waste (IDW) fluids resulting from the decontamination process. If decontamination is necessary, establish a decontamination station before beginning sampling. The station shall consist of an area of at least 4 feet by 2 feet covered with plastic sheeting and be located upwind of the well being sampled. The station shall be large enough to fit the appropriate number of wash and rinse buckets, and have sufficient room to place equipment after decontamination. One central cleaning area may be used throughout the entire sampling event. The area around the well being sampled shall also be covered with plastic sheeting to prevent spillage. Further details are presented in SOP 3-06, Equipment Decontamination.

Decontaminate each piece of equipment prior to entering the well. Also, conduct decontamination prior to sampling at a site, even if the equipment has been decontaminated subsequent to its last usage. Additionally, decontaminate each piece of equipment used at the site prior to leaving the site. It is only necessary to decontaminate dedicated sampling equipment prior to installation within the well. Do not place clean sampling equipment directly on the ground or other contaminated surfaces prior to insertion into the well. Dedicated sampling equipment that has been certified by the manufacturer as being decontaminated can be placed in the well without on-site decontamination.

8.2.3 Measurement of Static Water Level Elevation

Before purging the well, measure water levels in all of the wells within the zone of influence of the well being purged. The best practice, if possible, is to measure all site wells (or wells within the monitoring well network) prior to sampling. If the well cap is not vented, remove the cap several minutes before measurement to allow water levels to equilibrate to atmospheric pressure.

Measure the depth to standing water and the total depth of the well to the nearest 0.01 foot to provide baseline hydrologic data, to calculate the volume of water in the well, and to provide information on the integrity of the well (e.g., identification of siltation problems). If not already present, mark an easily identified reference point for water level measurements which will become the measuring point for all water level measurements. This location and elevation must be surveyed.

The device used to measure the water level surface and depth of the well shall be sufficiently sensitive and accurate in order to obtain a measurement to the nearest 0.01 foot reliably. An electronic water level meter will usually be appropriate for this measurement; however, when the groundwater within a particular well is highly contaminated, an inexpensive weighted tape measure can be used to determine well depth to prevent adsorption of contaminants onto the meter tape. The presence of light, non-aqueous phase liquids (LNAPLs) and/or dense, non-aqueous phase liquids (DNAPLs) in a well requires measurement of the elevation of the top and the bottom of the product, generally using an interface probe. Water levels in such wells must then be corrected for density effects to accurately determine the elevation of the water table.

At each location, measure water levels several times in quick succession to ensure that the well has equilibrated to atmospheric conditions prior to recording the measurement. As stated above, measure all site wells (or wells within the monitoring well network) prior to sampling whenever possible. This will provide a water level database that describes water levels across the site at one time (a synoptic sampling). Prior to sampling, measure the water level in each well immediately prior to purging the well to ascertain that static conditions have been achieved prior to sampling.

8.2.4 Detection of Immiscible Phase Layers

Complete the following steps for detecting the presence of LNAPL and DNAPL before the well is purged for conventional sampling. These procedures may not be required for all wells. Consult the project-specific SAP to determine if assessing the presence of LNAPL and/or DNAPL is necessary.

1) Sample the headspace in the wellhead immediately after the well is opened for organic vapors using either a PID or an organic vapor analyzer, and record the measurements.
2) Lower an interface probe into the well to determine the existence of any immiscible layer(s), LNAPL and/or DNAPL, and record the measurements.
3) Confirm the presence or absence of an immiscible phase by slowly lowering a clear bailer to the appropriate depth, then visually observing the results after sample recovery.
4) In rare instances, such as when very viscous product is present, it may be necessary to utilize hydrocarbon- and water-sensitive pastes for measurement of LNAPL thickness. This is accomplished by smearing adjacent, thin layers of both hydrocarbon- and water-sensitive pastes along a steel measuring tape and inserting the tape into the well. An engineering tape showing tenths and hundredths of feet is required. Record depth to water, as shown by the mark on the water-sensitive paste, and depth to product, as shown by the mark on the product-sensitive paste. In wells where the approximate depth to water and product thickness are not known, it is best to apply both pastes to the tape over a fairly long interval (5 feet or more). Under these conditions, measurements are obtained by trial and error and may require several insertions and retrievals of the tape before the paste-covered interval of the tape encounters product and water. In wells where approximate depths of air-product and product-water interfaces are known, pastes may be applied over shorter intervals. Water depth measurements should not be used in preparation of water table contour maps until they are corrected for depression by the product.
5) If the well contains an immiscible phase, it may be desirable to sample this phase separately. Section 8.2.6 presents immiscible phase sampling procedures. It may not be meaningful to conduct water sample analysis of water obtained from a well containing LNAPLs or DNAPLs. Consult the **Project Manager** and **Program Quality Manager** if this situation is encountered.

8.2.5 Purging Equipment and Use

General Requirements

The water present in a well prior to sampling may not be representative of in situ groundwater quality and shall be removed prior to sampling. Handle all groundwater removed from potentially contaminated wells in accordance with the IDW handling procedures in SOP 3-05, IDW Management. Purging shall be accomplished by methods as indicated in the project-specific SAP or by those required by State requirements. For the purposes of this SOP, purging methods will be described by removing groundwater from the well using low-flow techniques.

According to the U.S. Environmental Protection Agency (EPA) (EPA, 1996), the rate at which groundwater is removed from the well during purging ideally should be less than 0.2 to 0.3 liters/minute. EPA further states that wells should be purged at rates below those used to develop the well to prevent further development of the well, to prevent damage to the well, and to avoid disturbing accumulated corrosion or reaction products in the well. EPA also indicates that wells should be purged at or below their recovery rate so that migration of water in the formation above the well screen does not occur.

Realistically, the purge rate should be low enough that substantial drawdown in the well does not occur during purging. In addition, a low purge rate will reduce the possibility of stripping volatile organic compounds (VOCs) from the water, and will reduce the likelihood of increasing the turbidity of the sample due to mobilizing colloids in the subsurface that are immobile under natural flow conditions.

The field sampler shall ensure that purging does not cause formation water to cascade down the sides of the well screen. Wells should not be purged to dryness if recharge causes the formation water to cascade down the sides of the screen, as this will cause an accelerated loss of volatiles. This problem should be anticipated based on the results of either the well development task or historical sampling events. In general, place the intake of the purge pump in the middle of the saturated screened interval within the well to allow purging and at the same time minimize disturbance/overdevelopment of the screened interval in the well. Water shall be purged from the well at a rate that does not cause recharge water to be excessively agitated unless an extremely slow recharging well is encountered where complete evacuation is unavoidable. During the well purging procedure, collect water level and/or product level measurements to assess the hydraulic effects of purging. Sample the well when it recovers sufficiently to provide enough water for the analytical parameters specified. If the well is purged dry, allow the well to recover sufficiently to provide enough water for the specified analytical parameters, and then sample it.

Evaluate water samples on a regular basis during well purging and analyze them in the field preferably using in-line devices (i.e., flow through cell) for temperature, pH, specific conductivity, dissolved oxygen (DO), and oxidation-reduction (redox) potential. Turbidity should be measured separately (outside of the flow-through cell) with a nephelometer or similar device.

Readings should be taken every 2 to 5 minutes during the purging process. These parameters are measured to demonstrate that the natural character of the formation waters has been restored.

Purging shall be considered complete per the requirements set forth in the project-specific SAP, State requirements, or when three consecutive field parameter measurements of temperature, pH, specific conductivity, DO and ORP stabilize within approximately 10 percent and the turbidity is at or below 10 nephelometric turbidity units (NTU) or within ± 10% if above 10 NTU. This criterion may not be applicable to temperature if a submersible pump is used during purging due to the heating of the water by the pump motor. Enter all information obtained during the purging and sampling process into a groundwater sampling log. Attachment 1 shows an example of a groundwater sampling log and the information typically included in the form. Whatever form is used, all blanks need to be completed on the field log during field sampling.

Groundwater removed during purging shall be stored according to the project-specific SAP or per SOP 3-05, IDW Management.

Purging Equipment and Methods

Submersible Pump

A stainless steel submersible pump may be utilized for purging both shallow and deep wells prior to sampling the groundwater for semivolatile and non-volatile constituents, but are generally not preferred for VOCs unless there are no other options (e.g., well over 200 feet deep). For wells over 200 feet deep, the submersible pump is one of the few technologies available to feasibly accomplish purging under any yield conditions. For shallow wells with low yields, submersible pumps are generally inappropriate due to overpumpage of the wells (<1 gallon per minute), which causes increased aeration of the water within the well.

Steam clean or otherwise decontaminate the pump and discharge tubing prior to placing the pump in the well. The submersible pump shall be equipped with an anti-backflow check valve to limit the amount of water that will flow back down the drop pipe into the well. Place the pump in the middle of the saturated screened interval within the well and maintain it in that position during purging.

Bladder Pump

A stainless steel bladder pump can be utilized for purging and sampling wells up to 200 feet in depth for volatile, semivolatile, and non-volatile constituents. Use of the bladder pump is most effective in low to moderate yield wells and are often the preferred method for low-flow sampling. When sampling for VOCs and/or SVOCs, Teflon bladders should be used. Polyethylene bladders may be used when sampling for inorganics.

Either compressed dry nitrogen or compressed dry air, depending upon availability, can operate the bladder pump. The driving gas utilized must be dry to avoid damage to the bladder pump control box. Decontaminate the bladder pump prior to use.

Centrifugal, Peristaltic, or Diaphragm Pump

A centrifugal, peristaltic, or diaphragm pump may be utilized to purge a well if the water level is within 20 feet of ground surface. New or dedicated tubing is inserted into the midpoint of the saturated screened interval of the well. Water should be purged at a rate that satisfies low-flow requirements (i.e., does not cause drawdown). Centrifugal, peristaltic, or diaphragm pump are generally discouraged for VOCs sampling; however, follow methods allowed per the project-specific SAP or State requirements.

Air Lift Pump

Airlift pumps are not appropriate for purging or sampling.

Bailer

Avoid using a bailer to purge a well because it can result in overdevelopment of the well and create excessive purge rates. If a bailer must be used, the bailer should either be dedicated or disposable. Teflon-coated cable mounted on a reel is recommended for lowering the bailer in and out of the well.

Lower the bailer below the water level of the well with as little disturbance of the water as possible to minimize aeration of the water in the well. One way to gauge the depth of water on the reel is to mark the depth to water on the bailer wire with a stainless steel clip. In this manner, less time is spent trying to identify the water level in the well.

8.2.6 Monitoring Well Sampling Methodologies

Sampling Light, Non-Aqueous Phase Liquids (LNAPL)

Collect LNAPL, if present, prior to any purging activities. The sampling device shall generally consist of a dedicated or disposable bailer equipped with a bottom-discharging device. Lower the bailer slowly until contact is made with the surface of the LNAPL, and to a depth less than that of the immiscible fluid/water interface depth as determined by measurement with the interface probe. Allow the bailer to fill with LNAPL and retrieve it.

When sampling LNAPLs, never drop bailers into a well and always remove them from the well in a manner that causes as little agitation of the sample as possible. For example, the bailer should not be removed in a jerky fashion or be allowed to continually bang against the well casing as it is raised. Teflon bailers should always be used when sampling LNAPL. The cable used to raise and lower the bailer shall be composed of an inert material (e.g., stainless steel) or coated with an inert material (e.g., Teflon).

Sampling Dense, Non-Aqueous Phase Liquids (DNAPL)

Collect DNAPL prior to any purging activities. The best method for collecting DNAPL is to use a double-check valve, stainless steel bailer, or a Kemmerer (discrete interval) sampler. The sample shall be collected by slow, controlled lowering of the bailer to the bottom of the well, activation of the closing device, and retrieval.

Groundwater Sampling Methodology

The well shall be sampled when groundwater within it is representative of aquifer conditions per the methods described in Section 8.2.5. Prior to sampling the flow-through cell shall be removed and the samples collected directly from the purge tubing. Flow rates shall not be adjusted once aquifer conditions are met. Additionally, a period of no more than 2 hours shall elapse between purging and sampling to prevent groundwater interaction with the casing and atmosphere. This may not be possible with a slowly recharging well. Measure and record the water level prior to sampling in order to monitor drawdown when using low-flow techniques and gauge well volumes removed and recharged when using non-low-flow techniques.

Sampling equipment (e.g., especially bailers) shall never be dropped into the well, as this could cause aeration of the water upon impact. Additionally, the sampling methodology utilized shall allow for the collection of a groundwater sample in as undisturbed a condition as possible, minimizing the potential for volatilization or aeration. This includes minimizing agitation and aeration during transfer to sample containers, minimizing exposure to sunlight, and immediately placing the sample on ice once collected.

Sampling equipment shall be constructed of inert material. Equipment with neoprene fittings, polyvinyl chloride (PVC) bailers, Tygon® tubing, silicon rubber bladders, neoprene impellers, polyethylene, and Viton® are not acceptable when sampling for organics. If bailers are used, an inert cable/chain (e.g., fluorocarbon resin-coated wire or stainless steel wire or cable) shall be used to raise and lower the bailer. Dedicated equipment is highly recommended for all sampling programs.

Submersible Pumps

The submersible pump must be specifically designed for groundwater sampling (i.e., pump composed of stainless steel and Teflon, sample discharge lines composed of Teflon) and must have a controller mechanism allowing the required low-flow rate. Adjust the pump rate so that flow is continuous and does not pulsate to avoid aeration and agitation within the sample discharge lines. Run the pump for several minutes at the low-flow rate used for sampling to ensure that the groundwater in the lines was obtained at the low-flow rate.

Bladder Pumps

A gas-operated stainless steel bladder pump with adjustable flow control and equipped with a Teflon bladder and Teflon-lined tubing can be effectively utilized to collect a groundwater sample and is considered to be the best overall device for sampling inorganic and organic constituents. If only inorganics are being sampled, polyvinyl bladders and tubing may be used. Operate positive gas displacement bladder pumps in a continuous manner so that they minimize discharge pulsation that can aerate samples in the return tube or upon discharge.

When using a compressor, take several precautions. If the compressor is being powered by a gasoline generator, position the generator downwind of the well. Ground fault circuit interrupters (GFCIs) should always be used when using electric powered equipment. Do not connect the compression hose from the compressor to the pump controller until after the engine has been started.

When all precautions are completed and the compressor has been started, connect the compression hose to the pump controller. Slowly adjust the control knobs to discharge water in the shortest amount of time while maintaining a near constant flow. This does not mean that the compressor must be set to discharge the water as hard as possible. The optimal setting is one that produces the largest volume of purge water per minute (not per purge cycle) while maintaining a near constant flow rate.

Prior to sampling, adjust the flow rate (purge rate) to yield 100 to 300 mL/minute. Avoid settings that produce pulsating streams of water instead of a steady stream if possible. Operate the pump at this low flow rate for several minutes to ensure that drawdown is not occurring. At no time shall the sample flow rate exceed the flow rate used while purging.

For those samples requiring filtration, it is recommended to use an in-line high capacity filter after all non-filtered samples have been collected.

***Peristaltic Pumps*:**

A peristaltic pump is a type of positive displacement pump that moves water via the process of peristalsis. The pump uses a flexible hose fitted inside a circular pump casing. A rotor with cams compresses the flexible tube as the rotor turns, which forces the water to be pumped to move through the tube. In peristaltic pumps, no moving parts of the pump are in contact with the water being pumped. Displacement is determined by tube size, so delivery rate can only be changed during operation by varying pump speed. Peristaltic pumps are simple and quite inexpensive for the flow rates they provide.

There are several methods available for transferring the sample into the laboratory containers. The selected method may vary based on State requirements and should be documented in the project-specific SAP. Samples typically can be collected directly from the discharge end of the Teflon tubing, after it has been disconnected from the flow through cell. For volatile analyses, the sampler should make sure that the pump is set such that a smooth laminar flow is achieved. In all cases, the project team should consult their local regulatory requirements and document the selected sample collection procedure in the project-specific SAP.

Bailers

A single- or double-check valve Teflon or stainless steel bailer equipped with a bottom discharging device can be utilized to collect groundwater samples. Bailers have a number of disadvantages, however, including a tendency to alter the chemistry of groundwater samples due to degassing, volatilization, and aeration; the possibility of creating high groundwater entrance velocities; differences in operator techniques resulting in variable samples; and difficulty in determining where in the water column the sample was collected. Therefore, use bailers for groundwater sampling only when other types of sampling devices cannot be utilized for technical, regulatory, or logistical reasons.

Dedicated or disposable bailers should always be used in order to eliminate the need for decontamination and to limit the potential of cross-contamination. Each time the bailer is lowered to the water table, lower it in such a way as to minimize disturbance and aeration of the water column within the well.

8.2.7 Sample Handling and Preservation

Many of the chemical constituents and physiochemical parameters to be measured or evaluated during groundwater monitoring programs are chemically unstable and require preservation. The U.S. EPA document entitled, *Test Methods for Evaluating Solid Waste – Physical/Chemical Methods (SW-846)* (EPA 1997), includes a discussion of appropriate sample preservation procedures. In addition, SW-846 provides guidance on the types of sample containers to use for each constituent or common set of parameters. In general, check with specific laboratory or State requirements prior to obtaining field samples. In many cases, the laboratory will supply the necessary sample bottles and required preservatives. In some cases, the field sampling personnel may add preservatives in the field.

Improper sample handling may alter the analytical results of the sample. Therefore, transfer samples in the field from the sampling equipment directly into the container that has been prepared specifically for that analysis or set of compatible parameters as described in the project-specific SAP. It is not an acceptable practice for samples to be composited in a common container in the field and then split in the laboratory, or poured first into a wide mouth container and then transferred into smaller containers.

Collect groundwater samples and place them in their proper containers in the order of decreasing volatility and increasing stability. A preferred collection order for some common groundwater parameters is:

1. VOCs and total organic halogens (TOX)

2. Dissolved gases, total organic carbon (TOC), total fuel hydrocarbons
3. Semivolatile organics, pesticides
4. Total metals, general minerals (unfiltered)
5. Dissolved metals, general minerals (filtered)
6. Phenols
7. Cyanide
8. Sulfate and chloride
9. Nitrate and ammonia
10. Radionuclides

When sampling for VOCs, collect water samples in vials or containers specifically designed to prevent loss of VOCs from the sample. The analytical laboratory performing the analysis shall provide these vials. Collect groundwater from the sampling device in vials by allowing the groundwater to slowly flow along the sides of the vial. Sampling equipment shall not touch the interior of the vial. Fill the vial above the top of the vial to form a positive meniscus with no overflow. No headspace shall be present in the sample container once the container has been capped. This can be checked by inverting the bottle once the sample is collected and tapping the side of the vial to dislodge air bubbles. Sometimes it is not possible to collect a sample without air bubbles, particularly water that has high concentrations of dissolved gasses. In these cases, the field sampling personnel shall document the occurrence in the field logbook and/or sampling worksheet at the time the sample was collected. Likewise, the analytical laboratory shall note in the laboratory analysis reports any headspace in the sample container(s) at the time of receipt by the laboratory.

Special Handling Considerations

In general, samples for organic analyses should not be filtered. However, high turbidity samples for PCB analysis may require filtering. Consult the project-specific SAP for details on filtering requirements. Samples shall not be transferred from one container to another because this could cause aeration or a loss of organic material onto the walls of the container. TOX and TOC samples should be handled in the same manner as VOC samples.

When collecting total and dissolved metals samples, the samples should be collected sequentially. The total metals sample is collected from the pump unfiltered. The dissolved metals sample is collected after filtering with a 0.45-micron membrane in-line filter. Allow at least 500 mL of effluent to flow through the filter prior to sampling to ensure that the filter is thoroughly wetted and seated in the filter capsule. If required by the project-specific SAP, include a filter blank for each lot of filters used and always record the lot number of the filters.

Field Sampling Preservation

Preserve samples immediately upon collection. Ideally, sampling containers will be pre-preserved with a known concentration and volume of preservative. Certain matrices that have alkaline pH (greater than 7) may require more preservative than is typically required. An early assessment of preservation techniques, such as the use of pH strips after initial preservation, may therefore be appropriate. Guidance for the preservation of environmental samples can be found in the U.S. EPA *Handbook for Sampling and Sample Preservation of Water and Wastewater* (EPA 1982). Additional guidance can be found in other U.S. EPA documents (EPA 1992, 1996).

Field Sampling Log

A groundwater sampling log provided as Attachment 1 shall document the following:

- Identification of well

- Well depth
- Static water level depth and measurement technique
- Presence of immiscible layers and detection method
- Well yield
- Purge volume and pumping rate
- Time that the well was purged
- Sample identification numbers
- Well evacuation procedure/equipment
- Sample withdrawal procedure/equipment
- Date and time of collection
- Types of sample containers used
- Preservative(s) used
- Parameters requested for analysis
- Field analysis data
- Field observations on sampling event
- Name of sampler
- Weather conditions

9.0 Quality Control and Assurance

9.1 Field personnel will follow specific quality assurance (QA) guidelines as outlined in the project-specific SAP. The goal of the QA program should be to ensure precision, accuracy, representativeness, completeness, and comparability in the project sampling program.

9.2 Quality control (QC) requirements for sample collection are dependent on project-specific sampling objectives. The project-specific SAP will provide requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various QC samples such as trip blanks, field blanks, equipment rinse blanks, and field duplicate samples.

10.0 Data and records management

10.1 Records will be maintained in accordance with SOP 3-03, Recordkeeping, Sample Labelling, and Chain-of-Custody. Various forms are required to ensure that adequate documentation is made of the sample collection activities. These forms may include:

- Sample Collection Records;
- Field logbook;
- Chain-of-custody forms; and
- Shipping labels.

10.2 Sample collection records (Attachment 1) will provide descriptive information for the purging process and the samples collected at each monitoring well.

10.3 The field logbook is kept as a general log of activities and should not be used in place of the sample collection record.

10.4 Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes.

10.5 Shipping labels are required is sample coolers are to be transported to a laboratory by a third party (courier service).

11.0 Attachments or References

Attachment 1 – Groundwater Sampling Collection Record

ASTM Standard D5088. 2008. *Standard Practice for Decontamination of Field Equipment Used at Waste Sites.* ASTM International, West Conshohocken, PA. 2008. DOI: 10.1520/D5088-02R08. www.astm.org.

Environmental Protection Agency, United States (EPA). 1982. *Handbook for Sampling and Sample Preservation of Water and Wastewater.* EPA-600/4-82-029. Cincinnati: EPA Office of Research and Development, Environmental Monitoring and Support Laboratory.

EPA. 1992. *RCRA Groundwater Monitoring Draft Technical Guidance*. EPA/530/R-93/001. Office of Solid Waste. November.

EPA. 1996. *Ground Water Issue: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*. EPA/540/S-95/504. Office of Solid Waste and Emergency Response. April.

EPA. 1997. *Test Methods for Evaluating Solid Waste, Physical/Chemical Method (SW-846)*. 3rd ed., Final Update IIIA. Office of Solid Waste. Online updates at: http://www.epa.gov/epaoswer/hazwaste/test/new-meth.htm.

SOP 3-03, *Recordkeeping, Sample Labelling, and Chain-of-Custody*.

SOP 3-05, *IDW Management.*

SOP 3-06, *Equipment Decontamination*.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

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Attachment 1
Groundwater Sample Collection Record

Well ID:

Groundwater Sample Collection Record

Client:________________ Date:__________ Time: Start________ am/pm
Project No: ________________ Finish________ am/pm
Site Location: ________________
Weather Conds: ________________ Collector(s): ________________

1. **WATER LEVEL DATA: (measured from Top of Casing)**

a. Total Well Length________ **c.** Length of Water Column________ (a-b) Casing Diameter/Material

b. Water Table Depth________ **d.** Calculated Well Volume (see back)________ ________________

2. **WELL PURGEABLE DATA**

a. Purge Method:________________

b. Acceptance Criteria defined (see SAP or Work Plan)
- Minimum Required Purge Volume (@______well volumes)____________
- Maximum Allowable Turbidity __________NTUs
- Stabilization of parameters __________%

c. Field Testing Equipment used: Make Model Serial Number

____

____

____

Time (min)	Volume Removed (gal)	Temp. (°C)	pH s.u.	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (m)	Color/Odor/etc.

d. Acceptance criteria pass/fail Yes No N/A (continued on back)

Has required volume been removed ☐ ☐ ☐
Has required turbidity been reached ☐ ☐ ☐
Have parameters stabilized ☐ ☐ ☐
If no or N/A - Explain below.

____

3. **SAMPLE COLLECTION:** Method:________________

Sample ID Container Type No. of Containers Preservation Analysis Req. Time

____

____

____

____

Comments ________________

____

____

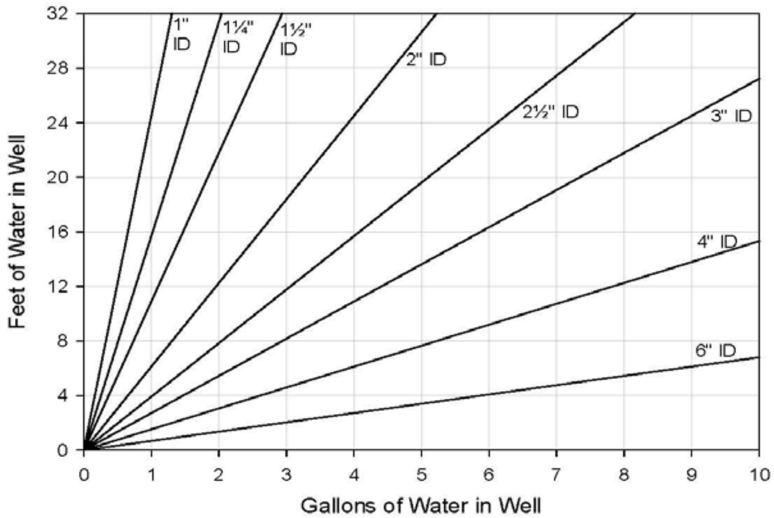
____

Signature________________ Date ________________

Page 1 of 2

Purge Volume Computation

Well ID:



Volume / Linear Ft. of Pipe		
ID (in)	**Gallon**	**Liter**
¼	0.0025	0.0097
⅜	0.0057	0.0217
½	0.0102	0.0386
¾	0.0229	0.0869
1	0.0408	0.1544
1¼	0.0637	0.2413
1½	0.0918	0.3475
2	0.1632	0.6178
2½	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

(continued from front)

Time (min)	Volume Removed (gal)	Temp. (°C)	pH s.u.	Spec. Cond. (μS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (m)	Color/Odor/etc.

Signature ______________________ Date ______________

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Monitoring Well and Borehole Abandonment

Procedure 3-15

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the methods used for the abandonment of groundwater monitoring wells, piezometers, and direct-push boreholes.

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM under the United States Army Corp of Engineers (USACE).

1.3 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP). In the absence of a APP/SSHP, work will be conducted according to the Work Plan (WP) and/or direction from the Site Safety Health Officer (SSHO).

2.2 Physical hazards associated with well installation include:

- To avoid lifting injuries associated with well abandonment practices, use the large muscles of the legs, not the back. The drilling contractor should use the drill rig wenching cables and appropriate heavy equipment to minimize manual lifting.
- Stay clear of all moving equipment and avoid wearing loose fitting clothing.
- When using an approved retractable-blade knife, cut away from one self.
- To avoid slip/trip/fall conditions during site activities, keep the area clear of excess soil cuttings and formation groundwater and use textured boots/boot cover bottoms in muddy areas.
- To avoid heat/cold stress because of exposure to extreme temperatures and PPE, drink electrolyte replacement fluids (1 - 2 cups per hour is recommended) and, in cases of extreme cold, wear fitted insulating clothing.
- Be aware of restricted mobility caused by PPE.

3.0 Terms and Definitions

3.1 **Annulus:** The annulus is the down-hole space between the borehole wall and the well casing and screen.

3.2 **Bridge:** A bridge is an obstruction in the drill hole or annulus. A bridge is usually formed by caving of the wall of the well bore, by the intrusion of a large boulder, or by the placement of filter pack materials during well completion. Bridging can also occur in the formation during well development.

3.3 **Filter Pack:** Filter pack is sand or gravel that is smooth, uniform, clean, well-rounded, and siliceous. It is placed in the annulus of the well between the borehole wall and the well screen to prevent formation materials from entering the well and to stabilize the adjacent formation.

3.4 **Grout:** Grout is a fluid mixture of cement and water that can be forced through a tremie pipe and emplaced in the annular space between the borehole and casing to form an impermeable seal. Various additives, such as sand, bentonite, and polymers, may be included in the mixture to meet certain requirements.

4.0 Interferences

4.1 The total depth of the monitoring well will be measured and the measurement will be compared to the original well completion log prior to abandonment.

4.2 A map with the location of the well to be abandoned and the surrounding wells, if any, will be utilized in the field to confirm the location of the well to be abandoned.

4.3 Information from the well identification tags/markings will be noted and the information compared to both the well completion log and the total depth measurement obtained in the field to confirm the identity of the well being abandoned.

5.0 Training and Qualifications

5.1 Qualifications and Training

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The **Project Manager** is responsible for ensuring that well abandonment activities comply with this procedure. The **Project Manager** is responsible for ensuring that all personnel involved in well abandonment shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Site Supervisor** is responsible for ensuring that all well abandonment activities are conducted according to the either this procedure or the applicable procedure presented in the project-specific SAP.

5.2.4 **Field sampling personnel** are responsible for the implementation of this procedure.

5.2.5 The field sampler and/or task manager is responsible for directly supervising the well abandonment procedures to ensure that they are conducted according to this procedure and for recording all pertinent data collected during sampling.

6.0 Equipment and Supplies

6.1 Equipment and materials used during monitoring well and piezometer abandonment include the following:

- Drill rig or trailer-mounted mixer and grout pump
- Filter pack material
- Pure sodium bentonite with no additives
- Bentonite pellets/chips
- Bentonite grout
- Portland Type II cement
- Water from an approved source
- Weighted tape measure

- Flexible hose
- Tremie pipe (small-diameter, rigid polyvinyl chloride [PVC] pipe)
- Weatherproof bound field logbook with numbered pages
- Appropriate health and safety equipment

7.0 Procedure

7.1 General Procedures

The following procedure applies to the abandonment of wells aborted prior to completion, existing wells determined to be ineffective or otherwise in need of closure, temporary wells, or boreholes (with the exception that boreholes will not have casing and pipe in place). Prior to abandoning any developed well, you may need to acquire a permit from the State or local governing body in which you are working. The permit application may require a detailed design of the well abandonment. In addition, prior to abandonment, all obstructions (e.g., pumps, lost equipment) must be removed from the well. Some States are strict in requiring the removal of all lost equipment prior to abandonment and will not allow the closure of a well with lost equipment in it. The State may require the removal of all objects to allow a proper seal during abandonment. Great lengths must be taken to reclaim lost items, such as the use of downhole video cameras to inspect and aid in the recovery of items. Prior to abandonment, confirm that the well selected for abandonment is properly located and identified to avoid abandoning the wrong well.

At locations where a well log is not available, the following procedure shall be implemented:

- The casing should be pulled, drilled out, or thoroughly pierced.
- With the use of a tremie pipe, grout should be placed from the bottom of the hole to within 3 feet of the ground surface.
- The material should be allowed to settle for 24 hours.
- The remainder of the hole should be filled with concrete.
- All historical sample data and abandonment procedures should be included in the records of work.

At locations where a well completion log is available, the following procedure shall be implemented:

- With the use of a tremie pipe, grout should be placed from the bottom of the hole to within 3 feet of the ground surface.
- The material should be allowed to settle for 24 hours.
- The remainder of the hole should be filled with concrete.
- All boring logs, historical sample data, completion records, and abandonment procedures should be included in the records of work.

Depending on the regulatory body under which you are working, the procedures listed above may differ. All work shall be performed by a licensed well driller in the State work is being performed. The licensed well driller is responsible for documenting the abandonment of the monitoring well with the appropriate State agency.

7.2 Replacement Wells

Replacement wells (if any) should normally be offset at least 15 feet from any abandoned well in an upgradient or crossgradient groundwater flow direction. Site-specific conditions may necessitate variation of this placement requiring the replacement well to be located either closer or further in proximity to the original well. To avoid potential issues related to grout migration into a well filter pack and/or screen section, replacement wells should be installed after the original/adjacent well is properly abandoned.

7.3 Grout

Bentonite grout is preferred for the abandonment of monitoring wells. Cement grout, if used for abandonment, should be composed of the following by weight:

- 20 parts cement (Portland cement, Type II or V)
- 0.4 to 1 part (maximum) (2 to 5 percent) bentonite
- 8 gallons (maximum) approved water per 94-pound bag of cement

Neither additives nor borehole cuttings should be mixed with the grout. Bentonite should be added after the required amount of cement has been mixed with the water. All grout material should be combined in an aboveground container and mechanically blended to produce a thick, lump-free mixture. The mixed grout should be recirculated through the grout pump prior to placement. The mixture can be combined and recirculated through a drill rig equipped for mud rotary drilling or through a mixer and grout pump mounted on a trailer.

Grout should be placed with the use of a commercially available grout pump and a rigid tremie pipe. Casing and grouting should be removed in stages, aquifer by aquifer, sealing the boring from the bottom to ground surface. This should be accomplished by placing a tremie pipe to the bottom and pumping grout through the pipe until undiluted grout reaches the bottom of the next higher section of casing or, for the topmost section, until grout flows from the boring at the ground surface.

After 24 hours, the abandoned drilling site should be checked for grout settlement. Any settlement depression should be filled with grout and rechecked 24 hours later. This process should be repeated until firm grout remains at the ground surface.

Be aware that when the drillers are finished, they will need a large supply of water to rinse out their equipment. This wash water must be containerized as IDW in accordance with SOP 3-05, *IDW Management*. Also, any materials (such as the removed protective casing, manhole covers, and concrete collars) shall be disposed of properly, or per the requirements of the project-specific SAP.

8.0 Quality Control and Assurance

8.1 Field personnel will follow specific quality assurance (QA) guidelines as outlined in the project-specific SAP.

8.2 Quality Control (QC) measures should be taken to ensure proper well abandonment in accordance with this SOP, project-specific SAP, and applicable well standards.

9.0 Records, Data Analysis, Calculations

9.1 All field information must be documented in the field logbook and/or on field data sheets with permanent ink. Data recorded may include the following:

- Date/time
- Well/piezometer location
- Personnel/subcontractor on site
- Abandonment method
- Depth of well/piezometer
- Materials used to seal each stratum
- Detailed description of procedure
- Date/time of return visit(s)
- Activities performed on return visit(s)
- Observations or problems encountered during abandonment

10.0 Attachments or References

Environmental Protection Agency, United States (EPA). 1987. *A Compendium of Superfund Field Operations Methods*. Office of Solid Waste and Emergency Response. EPA/540/P-87/001.

SOP 3-05, *IDW Management*.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Shawn Dolan Senior Scientist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (June 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

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AECOM

Soil and Rock Classification

Procedure 3-16

1.0 Purpose and Scope

1.1 The purpose of this document is to define the standard operating procedure (SOP) to thoroughly describe the physical characteristics of the sample and classify it according to the Unified Soil Classification System (USCS).

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM under United States Army Corp of Engineers (USACE) contracts.

1.3 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review. If there are procedures whether it be from AECOM, state and/or federal that are not addressed in this SOP and are applicable to surface water sampling then those procedures may be added as an appendix to the project specific SAP.

1.4 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Program Quality Manager. Deviations to this SOP will be documented in the field records.

2.0 Safety

2.1 Depending upon the site-specific contaminants, various protective programs must be implemented prior to sampling. All **field sampling personnel** responsible for sampling activities must review the project-specific Accident Prevention Plan (APP), with a Site-Safety and Health Plan (SSHP) attachment, paying particular attention to the control measures planned for the sampling tasks. Conduct preliminary area monitoring to determine the potential hazard to field sampling personnel. If significant contamination is observed, minimize contact with potential contaminants in both the vapor and liquid phase through the use of respirators and disposable clothing.

2.2 In addition, observe standard health and safety practices according to the project-specific APP. Suggested minimum protection during well sampling activities includes inner disposable vinyl gloves, outer chemical-protective nitrile gloves, rubberized steel-toed boots, and an American National Standards Institute-standard hard hat. Half-face respirators and cartridges and Tyvek® suits may be necessary depending on the contaminant concentrations, and shall always be available on site.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the **Site Safety and Health Officer (SSHO)** or designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP/SSHP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSHO.

2.4 The health and safety considerations for the work associated with soil classification include:

- At no time during classification activities are personnel to reach for debris near machinery that is in operation, place any samples in their mouth, or come in contact with the soils/rocks without the use of gloves.
- Stay clear of all moving equipment and be aware of pinch points on machinery. Avoid wearing loose fitting clothing.
- When using cutting tools, cut away from yourself. The use of appropriate, task specific cutting tools is recommended.
- To avoid heat/cold stress as a results of exposure to extreme temperatures and PPE, drink electrolyte replacement fluids (1 to 2 cups per hour is recommended) and in case of extreme cold, wear insulating clothing.

3.0 Terms and Definitions

None.

4.0 Interference

None.

5.0 Training and Qualifications

5.1 The **Project Manager** is responsible for ensuring that the soil and rock classification procedures comply with this procedure. The **Project Manager** is responsible for ensuring that all personnel involved in soil and rock classification shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.3 The **Site Supervisor** is responsible for ensuring that all project **field personnel** follow these procedures.

5.4 Field personnel are responsible for the implementation of this procedure. Minimum qualifications for **field sampling personnel** require that one individual on the field team shall have a minimum of 6 months of experience with soil and rock classification.

5.5 The **project geologist** and/or **task manager** is responsible for directly supervising the soil and rock classification procedures to ensure that they are conducted according to this procedure, and for recording all pertinent data collected. If deviations from the procedure are required because of anomalous field conditions, they must first be approved by the **Program Quality Manager** and then documented in the field logbook and associated report or equivalent document.

6.0 Equipment and Supplies

6.1 The following equipment list contains materials which may be needed in carrying out the procedures outlined in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP/SSHP
- Field log book and pen with indelible ink
- Boring log

- Munsell Soil Color Chart
- Scoopula, spatula, and/or other small hand tools
- California Sampler
- Hand-held penetrometer

7.0 Calibration or Standardization

None.

8.0 Procedure

8.1 Soil Classification

The basic purpose of the classification of soil is to thoroughly describe the physical characteristics of the sample and to classify it according to an appropriate soil classification system. The USCS was developed so that soils could be described on a common basis by different investigators and serve as a "shorthand" description of soil. A classification of a soil in accordance with the USCS includes not only a group symbol and name, but also a complete word description.

Describing soil on a common basis is essential so that soil described by different site qualified personnel is comparable. Site individuals describing soil as part of site activities *must* use the classification system described herein to provide the most useful geologic database for all present and future subsurface investigations and remedial activities.

The site geologist or other qualified individual shall describe the soil and record the description in a boring log, logbook, and/or electronic field data collection device. The essential items in any written soil description are as follows:

- Classification group name (e.g., silty sand)
- Color, moisture, and odor
- Range of particle sizes and maximum particle size
- Approximate percentage of boulders, cobbles, gravel, sand, and fines
- Plasticity characteristics of the fines
- In-place conditions, such as consistency, density, and structure
- USCS classification symbol

The USCS serves as "shorthand" for classifying soil into 15 basic groups:

GW[1] Well graded (poorly sorted) gravel (>50 percent gravel, <5percent fines)

GP[1] Poorly graded (well sorted) gravel (>50percent gravel, <5percent fines)

GM[1] Silty gravel (>50 percent gravel, >15 percent silt)

GC[1] Clayey gravel (>50 percent gravel, >15 percent clay)

SW[1] Well graded (poorly sorted) sand (>50 percent sand, <5 percent fines)

SP[1] Poorly graded (well sorted) sand (>50 percent sand, <5 percent fines)

---

[1] If percentage of fine is 5 percent to 15 percent, a dual identification shall be given (e.g., a soil with more than 50 percent poorly sorted gravel and 10 percent clay is designated GW-GC.

SM[1] Silty sand (>50 percent sand, >15 percent silt)

SC[1] Clayey sand (>50 percent sand, >15 percent clay)

ML[2] Inorganic, low plasticity silt (slow to rapid dilatancy, low toughness, and plasticity)

CL[2] Inorganic, low plasticity (lean) clay (no or slow dilatancy, medium toughness and plasticity)

MH[2] Inorganic elastic silt (no to slow dilatancy, low to medium toughness and plasticity)

CH[2] Inorganic, high plasticity (fat) clay (no dilatancy, high toughness, and plasticity)

OL Organic low plasticity silt or organic silty clay

OH Organic high plasticity clay or silt

PT Peat and other highly organic soil

Figure 8-1 defines the terminology of the USCS. Flow charts presented in Figure 8-2 and Figure 8-3 indicate the process for describing soil. The particle size distribution and the plasticity of the fines are the two properties of soil used for classification. In some cases, it may be appropriate to use a borderline classification (e.g., SC/CL) if the soil has been identified as having properties that do not distinctly place the soil into one group.

8.1.1 Estimation of Particle Size Distribution

One of the most important factors in classifying a soil is the estimated percentage of soil constituents in each particle size range. Being proficient in estimating this factor requires extensive practice and frequent checking. The steps involved in determining particle size distribution are listed below:

1. Select a representative sample (approximately 1/2 of a 6-inch long by 2.5-inch diameter sample liner).
2. Remove all particles larger than 3 inches from the sample. Estimate and record the percent by volume of these particles. Only the fraction of the sample smaller than 3 inches is classified.
3. Estimate and record the percentage of dry mass of gravel (less than 3 inches and greater than 1/4 inch).
4. Considering the rest of the sample, estimate, and record the percentage of dry mass of sand particles (about the smallest particle visible to the unaided eye).
5. Estimate and record the percentage of dry mass of fines in the sample (do not attempt to separate silts from clays).
6. Estimate percentages to the nearest 5 percent. If one of the components is present in a quantity considered less than 5 percent, indicate its presence by the term “trace”.
7. The percentages of gravel, sand, and fines must add up to 100 percent. “Trace” is not included in the 100 percent total.

8.1.2 Soil Dilatancy, Toughness, and Plasticity

8.1.2.1 Dilatancy

To evaluate dilatancy, follow these procedures:

---

[2] If the soil is estimated to have 15 percent to 25 percent sand or gravel, or both, the words “with sand” or “with gravel” (whichever predominates) shall be added to the group name (e.g., clay with sand, CL; or silt with gravel, ML). If the soil is estimated to have 30 percent or more sand or gravel, or both, the words “sandy” or “gravely” (whichever predominates) shall be added to the group name (e.g., sandy clay, CL). If the percentage of sand is equal to the percent gravel, use “sandy.”

1. From the specimen, select enough material to mold into a ball about 1/2 inch (12 millimeters [mm]) in diameter. Mold the material, adding water if necessary, until it has a soft, but not sticky, consistency.
2. Smooth the soil ball in the palm of one hand with the blade of a knife or small spatula. Shake horizontally, striking the side of the hand vigorously against the other hand several times. Note the reaction of water appearing on the surface of the soil. Squeeze the sample by closing the hand or pinching the soil between the fingers, and note the reaction as none, slow, or rapid in accordance with the criteria in Table 8-1. The reaction is the speed with which water appears while shaking, and disappears while squeezing.

Table 8-1: Criteria for Describing Dilatancy

Description	Criteria
None	No visible change in specimen.
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing.

8.1.2.2 Toughness

Following the completion of the dilatancy test, shape the test specimen into an elongated pat and roll it by hand on a smooth surface or between the palms into a thread about 1/8 inch (3 mm) in diameter. (If the sample is too wet to roll easily, spread it into a thin layer and allow it to lose some water by evaporation.) Fold the sample threads and re-roll repeatedly until the thread crumbles at a diameter of about 1/8 inch. The thread will crumble at a diameter of 1/8 inch when the soil is near the plastic limit. Note the pressure required to roll the thread near the plastic limit. Also, note the strength of the thread. After the thread crumbles, lump the pieces together and knead it until the lump crumbles. Note the toughness of the material during kneading. Describe the toughness of the thread and lump as low, medium, or high in accordance with the criteria in Table 8-2.

Table 8-2: Criteria for Describing Toughness

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread near the plastic limit. The thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread near the plastic limit. The thread and the lump have very high stiffness.

DEFINITION OF TERMS

MAJOR DIVISIONS			SYMBOLS	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS More Than Half of Material is Larger Than No. 200 Sieve Size	**GRAVELS** More Than Half of Coarse Fraction is Smaller Than No. 4 Sieve	**CLEAN GRAVELS** (Less than 6% Fines)	**GW**	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS With Fines	**GM**	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More Than Half of Coarse Fraction is Smaller Than No. 4 Sieve	**CLEAN SANDS** (Less than 6% Fines)	**SW**	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SANDS With Fines	**SM**	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More Than Half of Material is Smaller Than No. 200 Sieve Size	**SILTS AND CLAYS** Liquid Limit is Less Than 50%		**ML**	Inorganic silts, rock flour, fine sandy silts or clays, and clayey silts with non- or slightly-plastic fines
			CL	Inorganic clays of low to medium plasticity, gravelly clays, silty clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid Limit is Greater Than 50%		**MH**	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts, clayey silt
			CH	inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			**PT**	Peat and other highly organic soils

GRAIN SIZES

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
200	40	10	4	3/4"	3"	12"	
	U.S. STANDARD SERIES SIEVE			CLEAR SQUARE SIEVE OPENINGS			

Figure8-1: Unclassified Soil Classification System (USCS)

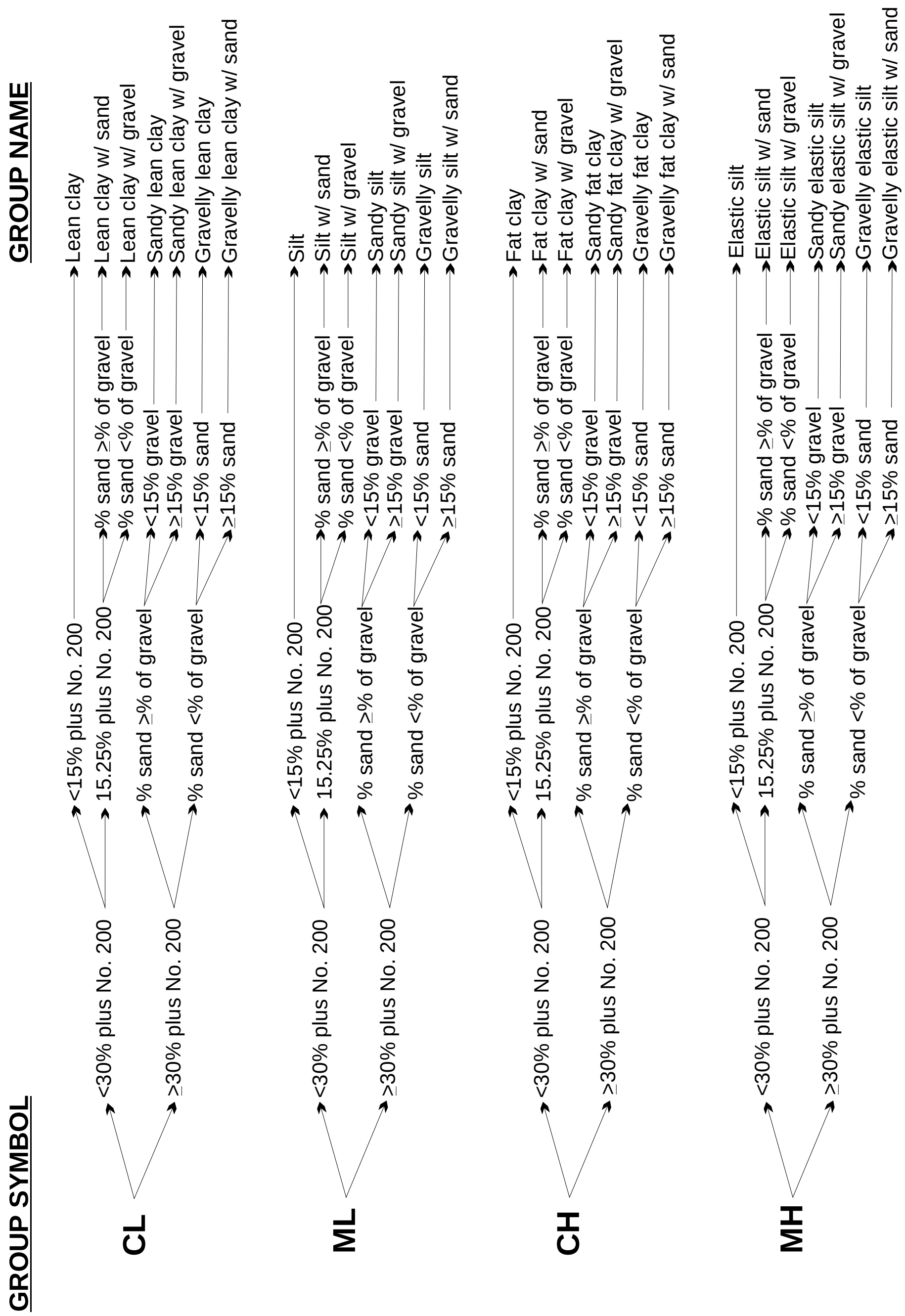

Figure 8-2: Flow Chart for Fine Grain Soil Classification

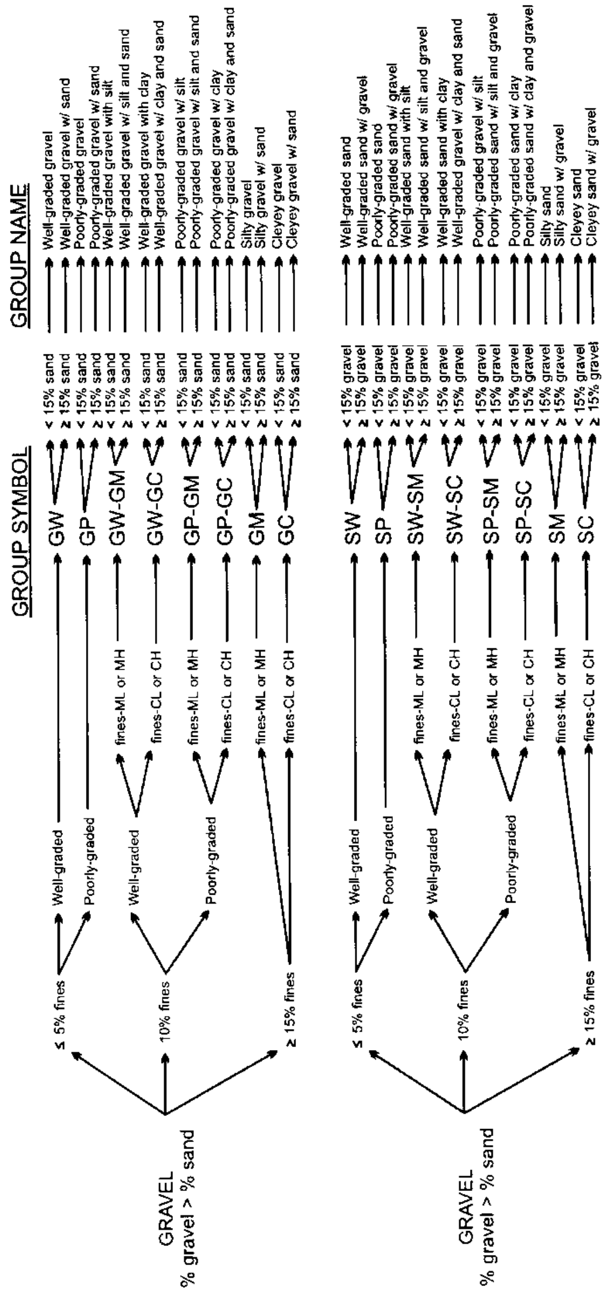

Figure 8-3: Flow Chart for Soil with Gravel

8.1.2.3 *Plasticity*

The plasticity of a soil is defined by the ability of the soil to deform without cracking, the range of moisture content over which the soil remains in a plastic state, and the degree of cohesiveness at the plastic limit. The plasticity characteristic of clays and other cohesive materials is defined by the liquid limit and plastic limit. The liquid limit is defined as the soil moisture content at which soil passes from the liquid to the plastic state as moisture is removed. The test for the liquid limit is a laboratory, not a field, analysis.

The plastic limit is the soil moisture content at which a soil passes from the plastic to the semi-solid state as moisture is removed. The plastic limit test can be performed in the field and is indicated by the ability to roll a 1/8-inch (0.125-inch) diameter thread of fines, the time required to roll the thread, and the number of times the thread can be re-rolled when approaching the plastic limit.

The plasticity tests are not based on natural soil moisture content, but on soil that has been thoroughly mixed with water. If a soil sample is too dry in the field, add water prior to performing classification. If a soil sample is too sticky, spread the sample thin and allow it to lose some soil moisture.

Table 8-3 presents the criteria for describing plasticity in the field using the rolled thread method.

Table 8-3: Criteria for Describing Plasticity

Description	Criteria
Non-Plastic	A 1/8-inch thread cannot be rolled.
Low Plasticity	The thread can barely be rolled.
Medium Plasticity	The thread is easy to roll and not much time is required to reach the plastic limit.
High Plasticity	It takes considerable time rolling the thread to reach the plastic limit.

8.1.3 Angularity

The following criteria describe the angularity of the coarse sand and gravel particles:

- **Rounded** particles have smoothly-curved sides and no edges.
- **Subrounded** particles have nearly plane sides, but have well-rounded corners and edges.
- **Subangular** particles are similar to angular, but have somewhat rounded or smooth edges.
- **Angular** particles have sharp edges and relatively plane sides with unpolished surfaces. Freshly broken or crushed rock would be described as angular.

8.1.4 Color, Moisture, and Odor

The natural moisture content of soil is very important. Table 8-4 shows the terms for describing the moisture condition and the criteria for each.

Table 8-4: Soil Moisture Content Qualifiers

Qualifier	Criteria
Dry	Absence of moisture, dry to the touch
Moist	Damp but no visible water
Wet	Visible water, usually soil is below water table

Color is described by hue and chroma using the Munsell Soil Color Chart (Munsell 2000). For uniformity, all site geologists shall utilize this chart for soil classification. Doing so will facilitate correlation of geologic units between boreholes logged by different geologists. The Munsell Color Chart is a small booklet of numbered color chips with names like “5YR 5/6, yellowish-red.” Note mottling or banding of colors. It is particularly important to note and describe staining because it may indicate contamination.

In general, wear a respirator if strong organic odors are present. If odors are noted, describe them if they are unusual or suspected to result from contamination. An organic odor may have the distinctive smell of decaying vegetation. Unusual odors may be related to hydrocarbons, solvents, or other chemicals in the subsurface. An organic vapor analyzer may be used to detect the presence of volatile organic contaminants.

8.1.5 In-Place Conditions

Describe the conditions of undisturbed soil samples in terms of their density/consistency (i.e., compactness), cementation, and structure utilizing the following guidelines:

8.1.5.1 Density/Consistency

Density and consistency describe a physical property that reflects the relative resistance of a soil to penetration. The term “density” is commonly applied to coarse to medium-grained sediments (i.e., gravels, sands), whereas the term “consistency” is normally applied to fine-grained sediments (i.e., silts, clays). There are separate standards of measure for both density and consistency that are used to describe the properties of a soil.

The density or consistency of a soil is determined by observing the number of blows required to drive a 1 3/8-inch (35 mm) diameter split barrel sampler 18 inches using a drive hammer weighing 140 lbs (63.5 kilograms [kg]) dropped over a distance of 30 inches (0.76 meters). Record the number of blows required to penetrate each 6 inches of soil in the field boring log during sampling. The first 6 inches of penetration is considered to be a seating drive; therefore, the blow count associated with this seating drive is recorded, but not used in determining the soil density/consistency. The sum of the number of blows required for the second and third 6 inches of penetration is termed the “standard penetration resistance,” or the “N-value.” The observed number of blow counts must be corrected by an appropriate factor if a different type of sampling device (e.g., Modified California Sampler with liners) is used. For a 2 3/8-inch inner diameter (I.D.) Modified California Sampler equipped with brass or stainless steel liners and penetrating a cohesionless soil (sand/gravel), the N-value from the Modified California Sampler must be divided by 1.43 to provide data that can be compared to the 1 3/8-inch diameter sampler data.

For a cohesive soil (silt/clay), the N-value for the Modified California Sampler should be divided by a factor of 1.13 for comparison with 1 3/8-inch diameter sampler data.

Drive the sampler and record blow counts for each 6-inch increment of penetration until one of the following occurs:

- A total of 50 blows have been applied during any one of the three 6-inch increments; a 50-blow count occurrence shall be termed “refusal” and noted as such on the boring log.
- A total of 150 blows have been applied.
- The sampler is advanced the complete 18 inches without the limiting blow counts occurring, as described above.

If the sampler is driven less than 18 inches, record the number of blows per partial increment on the boring log. If refusal occurs during the first 6 inches of penetration, the number of blows will represent the N-value for this sampling interval. Table 8-5 and Table 8-6 present representative descriptions of soil density/consistency vs. N-values.

Table 8-5: Measuring Soil Density with a California Sampler – Relative Density (Sands, Gravels)

Description	Field Criteria (N-Value)	
	1 3/8 in. ID Sampler	2 in. ID Sampler using 1.43 factor
Very Loose	0–4	0–6
Loose	4–10	6–14
Medium Dense	10–30	14–43
Dense	30–50	43–71
Very Dense	> 50	> 71

Table 8-6: Measuring Soil Density with a California Sampler – Fine Grained Cohesive Soil

Description	Field Criteria (N-Value)	
	1 3/8 in. ID Sampler	2 in. ID Sampler using 1.13 factor
Very Soft	0–2	0–2
Soft	2–4	2–4
Medium Stiff	4–8	4–9
Stiff	8–16	9–18
Very Stiff	16–32	18–36
Hard	> 32	> 36

For undisturbed fine-grained soil samples, it is also possible to measure consistency with a hand-held penetrometer. The measurement is made by placing the tip of the penetrometer against the surface of the soil contained within the sampling liner or shelby tube, pushing the penetrometer into the soil a distance specified by the penetrometer manufacturer, and recording the pressure resistance reading in pounds per square foot (psf). The values are as follows (Table 8-7):

Table 8-7: Measuring Soil Consistency with a Hand-Held Penetrometer

Description	Pocket Penetrometer Reading (psf)
Very Soft	0–250
Soft	250–500
Medium Stiff	500–1000
Stiff	1000–2000
Very Stiff	2000–4000
Hard	>4000

Consistency can also be estimated using thumb pressure using Table 8-8.

Table 8-8: Measuring Soil Consistency Using Thumb Pressure

Description	Criteria
Very Soft	Thumb will penetrate soil more than 1 inch (25 mm)
Soft	Thumb will penetrate soil about 1 inch (25 mm)
Firm	Thumb will penetrate soil about 1/4 inch (6 mm)
Hard	Thumb will not indent soil but readily indented with thumbnail
Very Hard	Thumbnail will not indent soil

8.1.5.2 *Cementation*

Cementation is used to describe the friability of a soil. Cements are chemical precipitates that provide important information as to conditions that prevailed at the time of deposition, or conversely, diagenetic effects that occurred following deposition. Seven types of chemical cements are recognized by Folk (1980). They are as follows:

- Quartz – siliceous
- Chert – chert-cemented or chalcedonic
- Opal – opaline
- Carbonate – calcitic, dolomitic, sideritic (if in doubt, calcareous should be used)
- Iron oxides – hematitic, limonitic (if in doubt, ferruginous should be used)
- Clay minerals – if the clay minerals are detrital or have formed by recrystallization of a previous clay matrix, they are not considered to be a cement. Only if they are chemical precipitates, filling previous pore space (usually in the form of accordion-like stacks or fringing radial crusts) should they be included as "kaolin-cemented," "chlorite-cemented," etc.
- Miscellaneous minerals – pyritic, collophane-cemented, glauconite-cemented, gypsiferous, anhydrite-cemented, baritic, feldspar-cemented, etc.

The degree of cementation of a soil is determined qualitatively by utilizing finger pressure on the soil in one of the sample liners to disrupt the gross soil fabric. The three cementation descriptors are as follows:

- Weak – friable; crumbles or breaks with handling or slight finger pressure
- Moderate – friable; crumbles or breaks with considerable finger pressure
- Strong – not friable; will not crumble or break with finger pressure

8.1.5.3 *Structure*

This variable is used to qualitatively describe physical characteristics of soil that are important to incorporate into hydrogeological and/or geotechnical descriptions of soil at a site. Appropriate soil structure descriptors are as follows:

- Granular – spherically shaped aggregates with faces that do not accommodate adjoining faces
- Stratified – alternating layers of varying material or color with layers at least 6 mm (1/4 inch) thick; note thickness
- Laminated – alternating layers of varying material or color with layers less than 6 mm (1/4 inch) thick; note thickness
- Blocky – cohesive soil that can be broken down into small angular or subangular lumps that resist further breakdown
- Lensed – inclusion of a small pocket of different soil, such as small lenses of sand, should be described as homogeneous if it is not stratified, laminated, fissured, or blocky. If lenses of different soil are present, the soil being described can be termed homogeneous if the description of the lenses is included
- Prismatic or Columnar – particles arranged about a vertical line, ped is bounded by planar, vertical faces that accommodate adjoining faces; prismatic has a flat top; columnar has a rounded top
- Platy – particles are arranged about a horizontal plane

8.1.5.4 Other Features

- Mottled – soil that appears to consist of material of two or more colors in blotchy distribution
- Fissured – breaks along definite planes of fracture with little resistance to fracturing (determined by applying moderate pressure to sample using thumb and index finger)
- Slickensided – fracture planes appear polished or glossy, sometimes striated (parallel grooves or scratches)

8.1.6 **Development of Soil Description**

Develop standard soil descriptions according to the following examples. There are three principal categories under which all soil can be classified. They are described below.

8.1.6.1 Coarse-grained Soil

Coarse-grained soil is divided into sands and gravels. A soil is classified as a sand if over 50 percent of the coarse fraction is "sand-sized." It is classified as a gravel if over 50 percent of the coarse fraction is composed of "gravel-sized" particles.

The written description of a coarse-grained soil shall contain, in order of appearance: Typical name including the second highest percentage constituent as an adjective, if applicable (underlined); grain size of coarse fraction; Munsell color and color number; moisture content; relative density; sorting; angularity; other features, such as stratification (sedimentary structures) and cementation, possible formational name, primary USCS classification, secondary USCS classification (when necessary), and approximate percentages of minor constituents (i.e., sand, gravel, shell fragments, rip-up clasts) in parentheses.

Example: POORLY-SORTED SAND WITH SILT, medium- to coarse-grained, light olive gray, 5Y 6/2, saturated, loose, poorly sorted, subrounded clasts, SW/SM (minor silt with approximately 20 percent coarse-grained sand-sized shell fragments, and 80 percent medium-grained quartz sand, and 5 percent to 15 percent ML).

8.1.6.2 Fine-grained Soil

Fine-grained soil is further subdivided into clays and silts according to its plasticity. Clays are rather plastic, while silts have little or no plasticity.

The written description of a fine-grained soil should contain, in order of appearance: Typical name including the second highest percentage constituent as an adjective, if applicable (underlined); Munsell color; moisture content; consistency; plasticity; other features, such as stratification, possible formation name, primary USCS classification, secondary USCS classification (when necessary), and the percentage of minor constituents in parentheses.

Example: SANDY LEAN CLAY, dusky red, 2.5 YR 3/2, moist, firm, moderately plastic, thinly laminated, CL (70 percent fines, 30 percent sand, with minor amounts of disarticulated bivalves [about 5 percent]).

8.1.6.3 Organic Soil

For highly organic soil, describe the types of organic materials present as well as the type of soil constituents present using the methods described above. Identify the soil as an organic soil, OL/OH, if the soil contains enough organic particles to influence the soil properties. Organic soil usually has a dark brown to black color and may have an organic odor. Often, organic soils will change color, (e.g., from black to brown) when exposed to air. Some organic soils will lighten in color significantly when air-dried. Organic soils normally will not have a high toughness or plasticity. The thread for the toughness test will be spongy.

8.2 Example: ORGANIC CLAY, black, 2.5Y, 2.5/1, wet, soft, low plasticity, organic odor, OL (100 percent fines), weak reaction to HCl.

8.3 Rock Classification

The purpose of rock classification is to thoroughly describe the physical and mineralogical characteristics of a specimen and to classify it according to an established system. The generalized rock classification system described below was developed because, unlike the USCS for soils, there is no universally accepted rock classification system. In some instances, a more detailed and thorough rock classification system may be appropriate. Any modifications to this classification system, or the use of an alternate classification system should be considered during preparation of the site work plan. Both the CTO Manager and the QA Manager or Technical Director must approve any modifications to this classification system, or the use of another classification system.

Describing rock specimens on a common basis is essential so that rocks described by different site geologists are comparable. Site geologists describing rock specimens as a part of investigative activities must use the classification system described herein, or if necessary, another more detailed classification system. Use of a common classification system provides the most useful geologic database for all present and future subsurface investigations and remedial activities.

In order to provide a more consistent rock classification between geologists, a rock classification template has been designated as shown in Figure 8-4. The template includes classification of rocks by origin and mineralogical composition. When classifying rocks, all site geologists shall use this template.

The site geologist shall describe the rock specimen and record the description in a boring log or logbook. The items essential for classification include (i.e., metamorphic foliated):

- Classification Name (i.e., schist)
- Color
- Mineralogical composition and percent
- Texture/Grain size (i.e., fine-grained, pegmatitic, aphlitic, glassy)
- Structure (i.e., foliated, fractured, lenticular)
- Rock Quality Designation (sum of all core pieces greater than two times the diameter of the core divided by the total length of the core run, expressed as a percentage)
- Classification symbol (i.e., MF)

Example: Metamorphic foliated schist: Olive gray, 5Y, 3/2, Garnet 25 percent, Quartz 45 percent, Chlorite 15 percent, Tourmaline 15 percent, Fine-grained with Pegmatite garnet, highly foliated, slightly wavy, MF.

9.0 Quality Control and Assurance

None

DEFINITION OF TERMS				
PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
SEDIMENTARY ROCKS	Clastic Sediments	CONGLOMERATE	CG	Coarse-grained Clastic Sedimentary Rock types including: Conglomerates and Breccias
		SANDSTONE	SS	Clastic Sedimentary Rock types including: Sandstone, Arkose and Greywacke
		SHALE	SH	Fine-grained Clastic Sedimentary Rock types including: Shale, Siltstone, Mudstone and Claystone
	Chemical Precipitates	CARBONATES	LS	Chemical Precipitates including: Limestone, Crystalline Limestone, Fossiliferous Limestone Micrite and Dolomite
		EVAPORITES	EV	Evaporites including: Anhydrite, Gypsum, Halite, Travertine and Caliche
IGNEOUS ROCKS		EXTRUSIVE (Volcanic)	IE	Volcanic Rock types including: Basalt, Andesite, Rhyolite, Volcanic Tuff, and Volcanic Breccia
		INTRUSIVE (Plutonic)	II	Plutonic Rock types including: Granite, Diorite and Gabbro
METAMORPHIC ROCKS		FOLIATED	MF	Foliated Rock types including: Slate, Phyllite, Schist and Gneiss
		NON-FOLIATED	MN	Non-foliated Rock types including: Metaconglomerate, Quartzite and Marble

Figure 8-4: Rock Classification System

10.0 Data and Records Management

10.1 Document soil classification information collected during soil sampling onto the field boring logs, field trench logs, and into the field notebook. Copies of this information shall be sent to the **CTO Manager** for the project files.

10.2 Field notes will be kept during coring activities in accordance with SOP 3-03 – Recordkeeping, Sample Labeling, and Chain of Custody. The information pertinent to soil classification activities includes chronology of events, sample locations (x,y,z), time/date, sampler name, methods (including type of core liner/barrel, if applicable), sampler penetration and acceptability, sample observations, and the times and type of equipment decontamination. Deviations to the procedures detailed in the SOP should be recorded in the field logbook.

11.0 Attachments or References

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Author	*Reviewer*	*Revisions (Technical or Editorial)*
Robert Shoemaker Senior Scientist	Naomi Ouellette, Project Manager	Rev 0 – Initial Issue
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Boring Log

Project Name: Camp Hero Remedial Investigation	Site:	**Hole ID:**
Project Number: 60443903.4.1	*Northing:*	Total Depth (feet):
Drilling Contractor: New England Geotech	*Easting:*	Date / Time Started:
Driller:	Elevation (feet MSL): *Ground:*	Date / Time Finished:
Drilling Equipment:	▼ Water Depth During Drilling (feet bgs):	Date / Time Completed:
Drilling Method:	Logged By:	Checked By:
Borehole Diameter (inches):	Weather/Comments:	

Depth (feet)	USCS Description	Log: Graphic	Log: USCS or Rock Type	Samples: Attempted Recovered	Samples: Method	Samples: Run Number	Samples: PID/FID (ppm)	Samples: Time	Well Diagram	Remarks (list sample numbers here)
										Soil Sample Info SB S#: SD: ST: Analyses:
5										SB S#: SD: ST: Analyses:
10										**Groundwater Sample Info** Well-head PID (ppm): DTW (ft bgs): GW S#: Screen interval (ft bgs): ST: Analyses: Temp (C): pH: SC (mS/cm): ORP (mV): DO (mg/L): Turbidity (NTU):
15										

Tracking Codes: 10/19/12, 12:21

USCS Name, **Consistency/Density** (predominantly fine: very soft {n=0-1}, soft {n=2-4}, medium stiff {n=5-8}, stiff {n=9-15}, very stiff {n=16-30}, hard {n=31+}/predominently coarse: very loose {n=0-4}, loose {n=5-10}, medium dense {n=11-30}, dense {n=31-50}, very dense {n=51+}). **Moisture**, (dry, moist, wet). **Color**. **Gradation** (relative percentages of soil components). **Plasticity/Cohesiveness** (predominently fine: nonplastic, slightly plastic, low plasticity, medium plasticity, high plasticity)/predominently coarse: cohesionless, slightly cohesive, cohesive). **Stratification/Structure** (blocky, massive, lensed, etc) (contacts: sharp, gradational) (bedding: horizontal, inclined). **Cementation** (none, weak, moderate, strong). **Other descriptive elements; Geologic Origin**
S# = Sample Number, **SD** = Sample Depth, **ST** = Sample Time, **A** = Analysis.
BZ = Breathing Zone, **BG** = Background, **BH** = Borehole, **CB** = Cuttings Bin

Form: 00-BLANK LOG

AECOM

Boring Log (Continued)

Project Name: Camp Hero Remedial Investigation	Site:	Hole ID:

Depth (feet)	USCS Description	Log: Graphic	Log: USCS or Rock Type	Samples: Attempted Recovered	Samples: Method	Samples: Run Number	Samples: PID/FID (ppm)	Samples: Time	Well Diagram	Remarks (list sample numbers here)
20										
25										
30										

Tracking Codes: 10/19/12, 12:20

Form: 00-BLANK LOG

Direct Push Sampling Techniques

Procedure 3-17

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) provides guidance on the use of direct push techniques for the United States Army Corp of Engineers (USACE).

1.2 This procedure is the Program-approved professional guidance for work performed by AECOM for USACE.

1.3 This procedure shall serve as management-approved professional guidance for the Program and is consistent with protocol in the Uniform Federal Policy-Quality Assurance Project Plan (DoD 2005). As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgment during unforeseen circumstances. Deviations from this procedure while planning or executing planned activities must be approved by both the Project Manager and the Quality Assurance (QA) Manager or Technical Director, and documented.

1.4 If there are procedures whether it be from AECOM, state and/or federal that are not addressed in this SOP and are applicable to direct push sampling then those procedures may be added as an appendix to the project-specific SAP.

2.0 Safety

2.1 Field personnel shall perform work in accordance with the site-specific Accident Prevention Plan (APP) and Site-Safety and Health Plan (SSHP). During monitoring well installation, subcontractors in direct contact with potentially contaminated media shall wear the proper personal protective equipment (PPE) as outlined in the site-specific health and safety plan. Failure to comply will result in disciplinary action.

2.2 If circumstances warrant, a real-time immediate response instrument, such as a Miniram Dust Monitor, organic vapor analyzer, HNu, Thermo, Draeger or Sensidyne tubes, or explosimeter, should be used to monitor the work area. When real/time instrument response exceeds the permissible exposure limit, personnel shall don the appropriate PPE and alternate control measures to ensure personnel safety. If safe control measures are not achievable, field activities shall be discontinued immediately. Company-specific APP/SSHPs offer guidelines on air surveillance and on selection of PPE. In addition, the site-specific APP/SSHP includes an air monitoring program and suggested PPE.

2.3 In addition to the aforementioned precautions and depending upon the type of contaminant expected, employ the following safe work practices:

Particulate or Metal Compounds

1. Avoid skin contact and/or incidental ingestion of soil.
2. Wear protective clothing, steel-toed boots, gloves, safety glasses, and hearing protection as warranted.

VOCs

1. Avoid breathing constituents venting from holes by approaching upwind, and/or by use of respiratory protection.
2. Pre-survey the area with a flame ionization detector (FID) or photoionization detector (PID) prior to sampling.

3. If monitoring results indicate organic vapors that exceed action levels as specified in the site-specific APP/SSHP, sampling activities may need to be conducted in Level C protection. At a minimum, skin protection will be required by use of gloves and Tyvek or other media that is protective against the media being encountered.

Flammable or Explosive Conditions

1. Monitor explosive gases as continuously as possible using an explosimeter and oxygen meter.
2. Place all ignition sources upwind or crosswind of the borehole.
3. If explosive gases exceed the designated action levels as specified in the site-specific APP/SSHP, cease operations and evaluate conditions.

Physical Hazards Associated With Soil Sampling

1. To avoid possible back strain associated with sample collection, use the large muscles of the legs, not the back, when retrieving soil samplers.
2. Stay clear of all moving equipment, and avoid wearing loose fitting clothing.
3. To avoid slip/trip/fall hazards, be wary of open trenches, pits, or holes.
4. Be aware of restricted mobility due to PPE.
5. To avoid hand, wrist, arm, shoulder, and back trauma due to the use of slide hammers or hand augers, rotate sampling among field personnel

3.0 Terms and Definitions

3.1 Direct push techniques are methods for subsurface sampling or monitoring that involve the application of downward pressure (usually supplied through hydraulic means) without the benefit of cutting tool rotation to enter soil. A variety of systems are available under several trade names, such as GeoProbe®. Equipment may be skid-mounted, trailered, or mounted directly on the frame of a vehicle.

4.0 Interferences

4.1 Potential interferences could result from cross-contamination between samples or sample locations. Minimization of the cross contamination will occur through the following:

- The use of clean sampling tools at each location as necessary.
- Avoidance of material that is not representative of the media to be sampled.

5.0 Training and Qualifications

5.1 Qualifications and Training

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The **Project Manager** is responsible for ensuring that these standard direct push technique procedures are followed during projects conducted under the Program and that a qualified individual conducts or supervises the projects. A qualified individual for subsurface sampling or monitoring using direct push techniques is defined as a person with a degree in geology, hydrogeology, or geotechnical/civil engineering with at least 1 year of experience supervising soil boring construction using conventional drilling or direct push techniques. The Project Manager or designee is responsible for ensuring that all personnel involved in direct push sampling techniques shall have the appropriate education, experience, and training to perform their assigned tasks as specified in Chief of Naval Operations Instruction 5090.1c (DON 2007).

5.2.2 The Program Quality Manager is responsible for ensuring overall compliance with this procedure.

5.2.3 The Site Supervisor is responsible for ensuring that all field personnel follow these procedures.

5.2.4 All Field Personnel are responsible for the implementation of this procedure.

5.2.5 The Field Personnel and/or Field Manager is responsible for directly supervising the direct push sampling procedures to ensure that they are conducted according to this procedure, and for recording all pertinent data collected during sampling.

6.0 Equipment and Supplies

In addition to those materials provided by the subcontractor, the project **Field Manager/Field Personnel** will require:

- Boring Logs;
- Spoons or scoops;
- Sample kit (bottles, labels, custody records and tape, cooler, ice), if laboratory analysis is required;
- Sample collection pan;
- Folding rule or tape measure;
- Plastic sheeting;
- Utility knife;
- Equipment decontamination materials (as described in SOP 3-06, *Equipment Decontamination*);
- Health and safety equipment (as required by APP/SSHP); and
- Field project notebook/pen.

7.0 Procedure

Direct push techniques may be used as a cost-effective alternative to conventional drilling techniques for obtaining subsurface soil and groundwater samples and for monitoring subsurface conditions.

7.1 Method Selection

Base the decision to use direct push techniques on: (1) their ability to achieve the required information at the required level of quality control and (2) their cost-effectiveness compared to conventional drilling methods. Major limitations of direct push techniques are their inability to penetrate rock or cobbles and a shallow maximum depth of penetration. The capabilities of direct push systems vary significantly among vendors. Consider these differences in capabilities when evaluating the method for a subsurface exploration program.

Use direct push techniques to obtain groundwater samples for confirmatory analyses only if the screen placement method protects the screen from clogging during installation and allows the installation of a sand-pack around the exterior of the well screen.

7.2 Inspection of Equipment

Inspect direct push equipment prior to use for signs of fluid leakage, which could introduce contaminants to the soil. If, at any time during equipment operation, fluid is observed leaking from the rig, cease operations and immediately repair or contain the leak. Collect, containerize, and label soil and other materials affected by the leak for proper disposal (see SOP 3-05, *IDW Management*).

7.3 Preparation of Work Site

Inspect the work site prior to commencing operations to ensure that no overhead hazards exist that could impact the direct push equipment, and the work area should cleared and/or marked by the local underground utility locating service (e.g., DigSafe). In addition, clear locations planned for subsurface exploration using either geophysical methods and/or hand excavate locations to a depth of 2 to 3 feet prior to soil penetration, unless it is certain (by virtue of subsurface clearing activities) that no utilities or other hazardous obstructions will be encountered in the first 2 to 3 feet. Hand excavation may be waived when it is not practical.

Locate the direct push rig so that it is downslope from the penetration point, if the work is to be performed on a grade. Locate the rig downwind or crosswind of the penetration point, if possible. Cover the area surrounding, and in the vicinity of, the penetration point with plastic. Establish required exclusion zones using plastic tape or cones to designate the various areas.

7.4 Equipment Decontamination

To avoid cross-contamination, thoroughly decontaminate equipment used for direct push exploration and sampling as described in SOP 3-06, *Equipment Decontamination*. Decontaminate sampling tools and downhole equipment between each sampling event and between penetration points. At a minimum, steam clean or wash and rinse the equipment. Collect, containerize, and label all wash and rinse water for proper disposal. Clean equipment (e.g., drive rods and samplers) shall not come into contact with contaminated soils or other contaminated materials. Keep equipment on plastic or protect it in another suitable fashion. Store push rods and other equipment removed from a hole on plastic sheeting until properly decontaminated.

7.5 Soil Sampling

This SOP assumes that the subcontractor will perform sampling; therefore, detailed procedures regarding sample acquisition are not provided. Vendors of direct push equipment offer a variety of sampling systems designed specifically for their equipment. Both continuous and discreet soil samples may be obtained using sampling equipment similar to that described in Procedure 3-21, *Surface and Subsurface Soil Sampling*. The preferred methods for soil sampling using direct push techniques use brass or stainless steel split-tube samplers that are driven through the horizon to be sampled. Use plastic sample tubes (e.g., Macro-Core Samplers) only for screening purposes or, in the case of confirmatory sampling, if samples will not be analyzed for volatile organic compounds (VOCs) or semivolatile organic compounds (SVOCs).

7.6 Groundwater Sampling

Direct push vendors offer numerous methods for obtaining groundwater samples. Key differences among methods involve: (1) the maximum well diameter achievable; (2) the ability to protect the well screen from exposure to contaminated overburden soils during installation; (3) the ability to install packing around the screen; (4) flexibility in the size, materials of construction, and design of well screens; and (5) the ability to convert sampling points into permanent monitoring wells. The limitations and abilities of a given system must be thoroughly understood and matched to the needs of the project before committing to the collection of groundwater samples using direct push techniques.

Use direct push techniques only to collect screening samples unless it is confirmed that the system:

1. Effectively protects the well screen from exposure to contaminated overburden soils during installation
2. Allows the installation of effective packing around the well screen
3. Allows the well screen to be effectively sealed against the downward infiltration of overlying groundwater or surface precipitation
4. Is constructed of materials compatible with the intended sampling and analysis goals of the project

5. Allows the use of a well screen properly sized and slotted for the needs of the project

Additional information on the collection of groundwater samples can be found in SOP 3-14 Monitoring Well Sampling.

It is the responsibility of the **Project Manager** to evaluate and determine the appropriateness of direct push systems prior to committing to their use on any project involving groundwater sampling. As part of this evaluation, it is recommended to obtain concurrence from regulatory authorities in advance for the method selection.

7.7 Borehole Abandonment

Methods for abandoning boreholes created with direct push systems will vary among vendors. Coordinate the desired method for abandonment with the vendor in the planning stages of the project to ensure proper abandonment.

Some direct push boreholes will close naturally as the drive rods and sampling tools are withdrawn. This may occur in loose, unconsolidated soils, such as sands. Close all boreholes using one of the procedures described in this procedure, unless natural caving precludes such closure.

The three methods for closing direct push boreholes are:

1. Add granulated or pelletized bentonite and hydrate in layers, proceeding from the bottom of the hole to the surface.
2. Pour premixed cement/water (or cement/water/bentonite) mixture into the hole.
3. Fill the entire hole with granular or pelletized bentonite and hydrate by means of a previously emplaced water tube that is gradually withdrawn as water is supplied to the bentonite.

The second method is recommended. For shallow holes less than 10 feet in depth, pour a cement/water/bentonite mix directly into the opening using a funnel. For deeper holes, use a conductor (tremie) pipe to carry the grout mix to the far reaches of the borehole. Lower the conductor pipe to within 2 inches of the bottom and gradually withdraw it as grout is added, keeping the lower end of the pipe submerged in grout at all times.

The recommended grout mixture for well abandonment is 7 to 9 gallons of water per 94-pound bag of Portland cement, with 3 percent to 5 percent by weight of powdered bentonite added to the mixture. Commercial products, such as Volcay are acceptable with pre-approval of the **Project Manager**.

Seal boreholes to within 0.5 to 2.0 feet of the surface. Inspect the abandoned borehole after 24 hours to ensure that grout shrinkage does not occur. If significant shrinkage has occurred, re-grout the borehole. Fill the remaining portion of the hole with local topsoil or appropriate paving materials.

8.0 Quality Control and Assurance

8.1 Collection of representative samples will be ensured through adherence to the procedures in this SOP and the sampling strategy outlined in the SAP. The field quality control samples identified in the SAP must be collected. These samples may include field duplicates, equipment rinsate blanks, trip blanks, and matrix spike/matrix spike duplicates

9.0 Records, Data Analysis, Calculations

9.1 Various forms are required to ensure that adequate documentation is made of the sample collection activities. These forms may include:

- Boring logs;
- Field logbook;

- Sample collection records;
- Chain-of-custody forms; and
- Shipping labels.

9.2 Boring logs (Attachment 1) will provide visual and descriptive information for samples collected at each soil boring and are often the most critical form of documentation generated during a soil sampling program.

9.3 The field logbook is kept as a general log of activities and should not be used in place of the boring log.

9.4 Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes.

9.5 Shipping labels are required is sample coolers are to be transported to a laboratory by a third party (courier service).

10.0 Attachments or References

10.1 Attachment 1 – Boring Log

10.2 Department of Defense, United States (DoD). 2005. *Uniform Federal Policy for Quality Assurance Project Plans, Part 1: UFP-QAPP Manual*. Final Version 1. DoD: DTIC ADA 427785, EPA-505-B-04-900A. In conjunction with the U. S. Environmental Protection Agency and the Department of Energy. Washington: Intergovernmental Data Quality Task Force. March. On-line updates available at: http://www.epa.gov/fedfac/pdf/ufp_qapp_v1_0305.pdf.

10.3 SOP 3-05, *IDW Management.*

10.4 SOP 3-06, *Equipment Decontamination.*

10.5 SOP 3-21, *Surface and Subsurface Soil Sampling.*

Author	Reviewer	Revisions (Technical or Editorial)
Mark Kromis Program Chemist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (APril 2017)

Attachment 1
Boring Log

Boring ID:

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Project Name:	Drilling Company:	Type of Surface Material:
Project Number:	Drilling Method:	Patching Material:
Date Started Drilling:	Rig Type:	Drilling Water Level:
Date Finished Drilling:	Core Size:	Boring Total Depth (bgs):
Physical Location:		Logged By:

(Note: bgs = below ground surface)

Depth Range	Re covery ft/ft	PID (ppm)	Moisture Content	GA Class.	USCS	GA Class: Garfield Avenue Sites classification & Modified Unified Soil Clasiffication System	
						Ground Surface Cover and Thickness:	Sample name & #:
0-1							
1-2							
2-3							
3-4							
4-5							
5-6							
6-7							
7-8							
8-9							
9-10							
10-11							
11-12							
12-13							
13-14							
14-15							
15-16							
16-17							
17-18							
18-19							
19-20							

Stratigraphic Unit Intervals:		Comments:
1.)	5.)	
2.)	6.)	
5.)	6.)	

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Field Analysis of Ferrous Iron Using the HACH DR890 Colorimeter and HACH Method 8146

Procedure 3-18

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) is applicable for the field analysis of water, wastewater, and seawater for ferrous iron (Fe^{2+}). Concentrations ranging up to 3.00 mg/L can be analyzed, with higher concentrations analyzed by diluting the samples. The estimated detection limit is 0.03 mg/L. The presence of ferrous iron is indicative of a reducing state, therefore measurement of ferrous iron is useful in determining whether site conditions are reducing.

1.2 The 1,10-phenanthroline indicator in the AccuVac ampul reacts with ferrous iron (Fe^{+2}) in the sample to form an orange color in proportion to the iron concentration. Ferric iron (Fe+3) does not react. The ferric ion concentration can be determined by subtracting the ferrous iron concentration from results of a total iron test.

1.3 Samples are analyzed immediately after collection because ferrous iron readily oxidizes to ferric iron upon exposure to air. A minimum volume of approximately 100 mL of sample is required to complete this analysis. A HACH "AccuVac" ampul (a vacuum-sealed glass ampul containing 1,10-phenanthroline reagent) is broken, tip down in the sample, and allowed to react for the required three minutes. The colorimeter is zeroed and the sample analyzed. The instrument must be zeroed with a sample water blank prior to each analysis.

2.0 Safety

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project Accident Prevention Plan (APP). In the absence of an APP, work will be conducted according to the Contract Task Order (CTO) Work Plan (WP) and/or direction from the Site Safety Officer (SSO).

2.2 Caution should be taken when working with all chemicals. Refer to the Material Safety Data Sheets (MSDSs) for the chemicals to be used.

2.3 Caution should be taken by the analyst with the sharp, broken glass that results after activating the AccuVac ampul.

3.0 Terms and Definitions

None.

4.0 Interferences

4.1 Ferrous iron (Fe^{2+}) oxidizes into ferric iron (Fe^{3+}) rapidly on exposure to air and addition of oxidants. Samples must be analyzed immediately after sample collection.

4.2 Color development due to the reaction of ferrous iron with 1,10-phenanthroline is time dependent. Therefore, it is critical that the reaction time allowed between addition of the reagent from the AccuVac vial and color measurement be consistent for all analyses and carefully timed.

4.3 Care should be taken to avoid cross-contamination between field samples. The analyst should change gloves each time before handling the field sample for analysis. Sample color and turbidity will interfere with colorimetric measurement. The colorimeter is therefore blank corrected with sample water prior to sample analysis and measurement.

5.0 Training and Qualifications

5.1 Qualifications and Training

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The CTO Manager is responsible for ensuring that field analysis activities comply with this procedure. The CTO Manager is responsible for ensuring that all personnel involved in the field analysis shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The Program Quality Manager is responsible for ensuring overall compliance with this procedure.

5.2.3 The Field Manager is responsible for ensuring that all field analysis is conducted according to this procedure.

5.2.4 All Field Personnel are responsible for the implementation of this procedure.

6.0 Equipment and Supplies

6.1 Equipment

- HACH DR/890 colorimeter;
- 3 HACH "AccuVac ampuls" (to allow for diluted analyses if required) per well;
- HACH colorimeter sample cell (for the blank) 10-20-25 mL, with cap;
- Plastic cups and lids;
- Graduated cylinders;
- Kimwipes®;
- Pipetter; and
- Deionized ultra-filtered water (DIUF) for dilutions.

7.0 Procedure

7.1 Sample Analysis Procedure

Approximately 100 mL of sample will be collected in a plastic cup. Some sample is poured into the HACH 10-20-25 mL sample cell as a blank, and the instrument is zeroed with the blank. An AccuVac ampul is broken into the remainder of the sample in the cup, and set to react for 3 minutes. The sample is then analyzed. The procedures are outlined below.

7.1.1 Turn on the colorimeter by pressing EXIT. Press PRGM. When prompted, enter 33 and press ENTER.

7.1.2 Check historical ferrous iron concentrations for the sample location if available, and determine if sample dilution is necessary: If the anticipated concentration is above 3.00 mg/L, the upper end of the operating range of the colorimeter, a dilution is necessary. Prepare an appropriate dilution with DIUF using the graduated cylinder and pipette as needed. Do not use the volume indicators on the sample cell as these are not sufficiently accurate. Place the required volume of sample into the graduated cylinder, and fill to the desired volume with DIUF to the total volume. Swirl the cylinder by grasping the top with three fingers, and swinging in a circle three times. Record the volumes of sample and DIUF used for the dilution.

7.1.3 Pour at least 10 mL of the sample or diluted sample water into the 10-20-25 mL sample cell (not an AccuVac ampul). This will be used for the blank to zero the colorimeter.

7.1.4 Clean the sample cell with a damp Kimwipe, followed by a dry Kimwipe.

7.1.5 Place the 10-20-25 mL sample cell in the colorimeter, using the same orientation each time.

7.1.6 Cover, and press ZERO.

7.1.7 Pour at least 10mL of the unused sample or diluted sample into a plastic cup. Immerse an inverted AccuVac ampul in the sample water and snap off the tip on the bottom of the cup. Hold the ampul in place until water is no longer entering the ampul (about 4 seconds).

7.1.8 Remove the ampul from the cup, and quickly invert several times to mix. It is not necessary to block the top of the ampul as the liquid will not leak out.

7.1.9 Press TIMER, and the press ENTER on the colorimeter. A three minute reaction period will begin. During this reaction period, wipe off the AccuVac ampul with a Kimwipe.

7.1.10 When the 3-minute timer is up (colorimeter will beep), put the ampul in the colorimeter, cover tightly with the colorimeter cap, press READ, and record the reading.

7.1.11 Record the colorimeter reading on the sample worksheet.

7.1.12 If the reading is >3.00, collect more sample, dilute the sample, and repeat steps 4 through 12. If the sample was diluted and the reading is <0.03, collect more sample, prepare at a lower dilution, and reanalyze.

8.0 Quality Control and Assurance

8.1 Precision, Accuracy, and Contamination

8.1.1 Precision and sample variability is assessed through analysis of 1 field duplicate sample per day, or per 20 field samples, whichever is more frequent. Precision of 30% RPD is considered acceptable for field duplicate analyses. Note that the rapid oxidation of ferrous iron precludes replicate analysis of a sample.

8.1.2 Potential contamination is assessed through the analysis of blanks. The colorimeter must be zeroed with a sample water blank prior to analysis of each sample. For diluted sample analyses, the blank should consist of the diluted sample water at the same dilution as the sample.

8.2 Sample Collection, Preservation, and Storage

8.2.1 Sample preservation and storage is not possible since ferrous iron oxidizes rapidly. Samples should be analyzed immediately after collection.

8.2.2 Use a clean, unused plastic jar to transfer sample.

8.3 Method Performance

The HACH DR/890 colorimeter has an estimated detection limit of 0.03 mg/l Fe^{2+} and an analytical standard deviation (single operator) of 0.009 mg/l Fe^{2+}.

8.4 Pollution Prevention

All dilutions will be carefully recorded and tabulated for use in future site analyses to minimize the number of dilutions and analyses required.

8.5 Waste Management

8.5.1 Unused sample must be disposed of as per the sampling and analysis plan, quality assurance project plan, and/or work plan.

8.5.2 The reacted AccuVac ampul should be placed in the AccuVac Vial Destruct Unit (AVDU) (a 1-L HDPE sample bottle with a large rock), and shaken to break the ampul. Replace the lid of the AVDU with the lid that has holes punctured in the top, and drain all remaining liquid from the AVDU into a container with the sample water for drumming, disposal, etc. Dispose of the glass-filled AVDU as unregulated solid waste.

8.5.3 Liquids drained from the test kits should be diluted five-fold with tap water for discharge to drain, or diluted with purge water and drummed with the purge water for disposal according to the sampling and analysis plan and/or work plan.

9.0 Records, Data Analysis, Calculations

9.1 Results should be reviewed prior to leaving the field to be sure field duplicates were within acceptance range and results did not exceed the instrument's range (3.00 mg/l).

9.2 The dilution factor is calculated as follows:

9.3 DF = (Volume of DIUF water + Volume of sample water) ÷ Volume of sample water

9.4 Concentration of ferrous iron in sample water = reading on colorimeter x DF

9.5 Example: If 10 mL of sample are diluted with 90 mL of DIUF water and the colorimeter reading was 2.3 mg/L, then:

9.6 Ferrous Iron Concentration (mg/L) = 2.3 mg/L x 10 = 23 mg/L

9.7 Unanticipated changes to the procedures or materials described in this POP (deviations) will be appropriately documented in the project records.

9.8 Records associated with the activities described in this POP will be maintained according to the document management policy for the project.

10.0 Attachments or References

10.1 United States Environmental Protection Agency. 2001. Guidance for Preparing Standard Operating Procedures (SOPs). EPA QA/G-6. EPA/240/B-01/004. USEPA Office of Environmental Information, Washington, DC. March 2001.

10.2 *Hach DR/890 Colorimeter Procedures Manual*, Edition 7, HACH Company, December 2005.

10.3 *Hach DR/820, DR/850, DR890 Portable Datalogging Colorimeter Instrument Manual*, Revision 5, HACH Company, 1997 1999.

Author	Reviewer	Revisions (Technical or Editorial)
Robert Shoemaker Senior Scientist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 – Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Operation and Calibration of a Photoionization Detector

Procedure 3-20

1.0 Purpose and Scope

1.1 Purpose and Applicability

1.1.1 This standard operating procedure (SOP) describes the procedures that will be followed by field staff for operation and calibration of a photoionization detector (PID). The PID is primarily used by AECOM personnel for safety and survey monitoring of ambient air, determining the presence of volatiles in soil and water, and detecting leakage of volatiles.

1.1.2 PIDs routinely used by field personnel include the Photovac Microtip, Thermoelectron 580EZ, and MiniRAE 2000. Personnel responsible for using the PID should first read and thoroughly familiarize themselves with the instrument instruction manual.

1.2 Principle of Operation

1.2.1 The PID is a non-specific vapor/gas detector. The unit generally consists of a hand-held probe that houses a PID, consisting of an ultraviolet (UV) lamp, two electrodes, and a small fan which pulls ambient air into the probe inlet tube. The probe is connected to a readout/control box that consists of electronic control circuits, a readout display, and the system battery. Units are available with UV lamps having an energy from 9.5 electron volts (eV) to 11.7 eV.

1.2.2 The PID analyzer measures the concentration of trace gas present in the atmosphere by photoionization. Photoionization occurs when an atom or molecule absorbs a photon of sufficient energy to release an electron and become a positive ion. This will occur when the ionization potential of the molecule (in electron volts (eV)) is less than the energy of the photon. The source of photons is an ultraviolet lamp in the probe unit. Lamps are available with energies ranging from 9.5 eV to 11.7 eV. All organic and inorganic vapor/gas compounds having ionization potentials lower than the energy output of the UV lamp are ionized and the resulting potentiometric change is seen as a positive reading on the unit. The reading is proportional to the concentration of organics and/or inorganics in the vapor.

1.2.3 Sample gases enter the probe through the inlet tube and enter the ion chamber where they are exposed to the photons emanating from the UV lamp. Ionization occurs for those molecules having ionization potentials near to or less than that of the lamp. A positive- biased polarizing electrode causes these positive ions to travel to a collector electrode in the chamber. Thus the ions create an electrical current which is amplified and displayed on the meter. This current is proportional to the concentration of trace gas present in the ion chamber and to the sensitivity of that gas to photoionization.

1.2.4 In service, the analyzer is first calibrated with a gas of known composition equal to, close to, or representative of that to be measured. Gases with ionization potentials near to or less than the energy of the lamp will be ionized. These gases will thus be detected and measured by the analyzer. Gases with ionization potentials greater than the energy of the lamp will not be detected. The ionization potentials of the major components of air, i.e., oxygen, nitrogen, and carbon dioxide, range from about 12.0 eV to 15.6 eV and are not ionized by any of the lamps available. Gases with ionization potentials near to or slightly higher than the lamp are partially ionized, with low sensitivity.

1.3 Specifications

1.3.1 Refer to the manufacturer's instructions for the technical specifications of the instrument being used. The operating concentration range is typically 0.1 to 2,000 ppm isobutylene equivalent.

2.0 Safety

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP). In the absence of a APP, work will be conducted according to the Work Plan (WP) and/or direction from the **Site Safety and Health Officer (SSHO)**.

2.2 Only PIDs stamped Division I Class I may be used in explosive atmospheres. Refer to the project APP/SSHP for instructions pertaining to instrument use in explosive atmospheres.

3.0 Terms and Definitions

None.

4.0 Interferences

4.1 Regardless of which gas is used for calibration, the instrument will respond to all analytes present in the sample that can be detected by the type of lamp used in the PID.

4.2 Moisture will generate a positive interference in the concentration measured for a PID and is characterized by a slow increase in the reading as the measurement is made. Care must be taken to minimize uptake of moisture to the extent possible. Refer to the manufacturers' instructions for care, cleaning, and maintenance.

4.3 Uptake of soil into the PID must be avoided as it will compromise instrument performance by blocking the probe, causing a positive interference, or dirtying the PID lamp. Refer to the manufacturers' instructions for care, cleaning, and maintenance.

4.4 The user should listen to the pitch of the sampling pump. Any changes in pitch may indicate a blockage and corrective action should be initiated.

5.0 Training and Qualifications

5.1 Qualifications and Training

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The Project Manager is responsible for ensuring that the operation and calibration activities comply with this procedure. The Project Manager is responsible for ensuring that all personnel involved in the operation and calibration shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The Program Quality Manager is responsible for ensuring overall compliance with this procedure.

5.2.3 The Site Supervisor is responsible for ensuring that all operation and calibration activities are conducted according to this procedure.

5.2.4 All Field Personnel are responsible for the implementation of this procedure.

6.0 Equipment and Supplies

- Calibration Gas: Compressed gas cylinder of isobutylene in air or similar stable gas mixture of known concentration. The selected gas should have an ionization potential similar to that of the vapors to be monitored, if known. The concentration should be at 50-75% of the range in which the instrument is to be calibrated;

- Regulator for calibration gas cylinder;
- Approximately 6 inches of Teflon® tubing;
- Tedlar bag (optional);
- Commercially-supplied zero grade air (optional);
- "Magic Marker" or "Sharpie" or other waterproof marker;
- Battery charger;
- Moisture traps;
- Spare lamps;
- Manufacturer's instructions; and
- Field data sheets or logbook/pen.

7.0 Procedure

7.1 Preliminary Steps

7.1.1 Preliminary steps (battery charging, check-out, calibration, maintenance) should be conducted in a controlled or non-hazardous environment.

7.2 Calibration

7.2.1 The PID must be calibrated in order to display concentrations in units equivalent to ppm. First a supply of zero air (ambient air or from a supplied source), containing no ionizable gases or vapors is used to set the zero point. A span gas, containing a known concentration of a photoionizable gas or vapor, is then used to set the sensitivity.

7.2.2 Calibrate the instrument according to the manufacturer's instructions. Record the instrument model and identification number, the initial and adjusted meter readings, the calibration gas composition and concentration, and the date and the time in the field records.

7.2.3 If the calibration cannot be achieved or if the span setting resulting from calibration is 0.0, then the lamp must be cleaned (Section 7.4).

7.3 Operation

7.3.1 Turn on the unit and allow it to warm up (minimum of 5 minutes). Check to see if the intake fan is functioning; if so, the probe will vibrate slightly and a distinct sound will be audible when holding the probe casing next to the ear. Also, verify on the readout display that the UV lamp is lit.

7.3.2 Calibrate the instrument as described in Section 7.2, following the manufacturer's instructions. Record the calibration information in the field records.

7.3.3 The instrument is now operational. Readings should be recorded in the field records.

7.3.4 When the PID is not being used or between monitoring intervals, the unit may be switched off to conserve battery power and UV lamp life; however, a "bump" test should be performed each time the unit is turned on and prior to taking additional measurements. To perform a bump test, connect the outlet tubing from a Tedlar bag containing a small amount of span gas to the inlet tubing on the unit and record the reading. If the reading is not within the tolerance specified in the project plan, the unit must be recalibrated.

7.3.5 At the end of each day, recheck the calibration. The check will follow the same procedures as the initial calibration (Section 7.2) except that no adjustment will be made to the instrument. Record the information in the field records.

7.3.6 Recharge the battery after each use (Section 7.4).

7.3.7 When transporting, ensure that the instrument is packed in its stored condition in order to prevent damage.

7.4 Routine Maintenance

7.4.1 Routine maintenance associated with the use of the PID includes charging the battery, cleaning the lamp window, replacing the detector UV lamp, replacing the inlet filter, and replacing the sample pump. Refer to the manufacturer's instructions for procedures and frequency.

7.4.2 All routine maintenance should be performed in a non-hazardous environment.

7.5 Troubleshooting Tips

7.5.1 One convenient method for periodically confirming instrument response is to hold the sensor probe next to the tip of a magic marker. A significant reading should readily be observed.

7.5.2 Air currents or drafts in the vicinity of the probe tip may cause fluctuations in readings.

7.5.3 A fogged or dirty lamp, due to operation in a humid or dusty environment, may cause erratic or fluctuating readings. The PID should never be operated without the moisture trap in place.

7.5.4 Moving the instrument from a cool or air-conditioned area to a warmer area may cause moisture to condense on the UV lamp and produce unstable readings.

7.5.5 A zero reading on the meter should not necessarily be interpreted as an absence of air contaminants. The detection capabilities of the PID are limited to those compounds that will be ionized by the particular probe used.

7.5.6 Many volatile compounds have a low odor threshold. A lack of meter response in the presence of odors does not necessarily indicate instrument failure.

7.5.7 When high vapor concentrations enter the ionization chamber in the PID the unit can become saturated or "flooded". Remove the unit to a fresh air environment to allow the vapors to be completely ionized and purged from the unit.

8.0 Quality Control and Assurance

8.1 The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific workplan or Sampling and Analysis Plan (SAP), hereafter referred to as the project plan.

8.2 Calibration of the PID will be conducted at the frequency specified in the project plan. In the absence of project-specific guidance, calibration will be performed at the beginning of each day of sampling and will be checked at the end of the sampling day or whenever instrument operation is suspect. The PID will sample a calibration gas of known concentration. The instrument must agree with the calibration gas within ±10%. If the instrument responds outside this tolerance, it must be recalibrated.

8.3 Checks of the instrument response (Section 7.5) should be conducted periodically and documented in the field records.

9.0 Records, Data Analysis, Calculations

Safety and survey monitoring with the PID will be documented in a bound field logbook, or on standardized forms, and retained in the project files. The following information is to be recorded:

- Project name and number;
- Instrument manufacturer, model, and identification number;

- Operator's signature;
- Date and time of operation;
- Calibration gas used;
- Calibration check at beginning and end of day (meter readings before adjustment);
- Span setting after calibration adjustment;
- Meter readings (monitoring data obtained);
- Instances of erratic or questionable meter readings and corrective actions taken; and
- Instrument checks and response verifications – e.g., battery check, magic marker response (Section 7.5) or similar test.

10.0 Attachments or References

United States Environmental Protection Agency. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM). USEPA, Region 4, SESD, Enforcement and Investigations Branch, Athens, GA. November 2001.

Author	Reviewer	Revisions (Technical or Editorial)
Robert Shoemaker Senior Scientist Amanda Martin Environmental Scientist	Chris Barr Program Quality Manager Mark Kauffman Program Manager	Rev 0 – Initial Issue (May 2012) Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (APril 2017)

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AECOM

Surface and Subsurface Soil Sampling Procedures

Procedure 3-21

1.0 Purpose and Scope

1.1 This standard operating procedure (SOP) describes the procedures for soil sampling. The procedure includes surface and subsurface sampling by various methods using hand auguring, test pit, direct-push, and split-spoon equipment.

1.2 The procedure includes soil sampling for volatile organic compounds (VOCs). For project specific information (e.g. sampling depths, equipment to be used, and frequency of sampling), refer to the Sampling and Analysis Plan (SAP), which takes precedence over these procedures. Surface soil sampling, typically considered to be up to two feet below ground surface by EPA standards, is typically accomplished using hand tools such as shovels or hand augers. Test pit samples are considered subsurface samples, although normally collected via hand tools similar to surface soil sampling or by excavation machinery. Direct-push and split-spoon sampling offer the benefit of collecting soil samples from a discrete or isolated subsurface interval, without the need of extracting excess material above the target depth. These methods dramatically reduce time and cost associated with disposal of material from soil cuttings when compared to test pit sampling. In addition, direct-push and split-spoon sampling methods can obtain samples at targeted intervals greater than 15 feet in depth, allowing for discrete depth soil sampling while speeding up the sampling process. Direct-push methods work best in medium to fine-grained cohesive materials such as medium to fine sands, silts, and silty clay soils. Split-spoon sampling works well in all types of soil, but is somewhat slower than direct-push methods. Samples are composited so that each sample contains a homogenized representative portion of the sample interval. Due to potential loss of analytes, samples for volatile analysis are not composited. Samples for chemical analysis can be collected by any of the above-mentioned sampling methods, as disturbed soil samples. Undisturbed samples are collected, sealed, and sent directly to the laboratory for analysis. For undisturbed samples, the samples are not homogenized.

2.0 Safety

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the project-specific Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP). In the absence of a APP/SSHP, work will be conducted according to the Work Plan (WP) and/or direction from the **Site Safety and Health Officer (SSHO)**.

2.2 Before soil sampling commences, appropriate entities (e.g. DigSafe, local public works departments, company facilities) must be contacted to assure the anticipated soil sampling locations are marked for utilities, including electrical, telecommunications, water, sewer, and gas.

3.0 Terms and Definitions

None.

4.0 Interferences

4.1 Low recovery of soil from sampling equipment will prevent an adequate representation of the soil profile and sufficient amount of soil sample. If low recovery is a problem, the hole may be offset and re-advanced, terminated, or continued using a larger diameter sampler.

4.2 Asphalt in soil samples can cause false positive results for hydrocarbons. To ensure samples are free of asphalt, do not collect samples that may contain asphalt. If the collection of samples potentially containing asphalt is unavoidable, note the sampling depths at which the presence of asphalt are suspected.

4.3 Instrumentation interferences addressed in SOPs for Calibration of the Photoionization Detector (PID), Headspace Screening for Total Volatile Organics, and Equipment Decontamination must also be considered.

4.4 Cross contamination from sampling equipment must be prevented by using sampling equipment constructed of stainless steel that is adequately decontaminated between samples.

5.0 Training and Qualifications

5.1 Qualifications and Training

The individual executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The Project Manager is responsible for ensuring that soil sampling activities comply with this procedure. The Project Manager is responsible for ensuring that all personnel involved in soil sampling shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The Program Quality Manager is responsible for ensuring overall compliance with this procedure.

5.2.3 The Field Manager is responsible for ensuring that all soil sampling activities are conducted according to this procedure.

5.2.4 All Field Personnel are responsible for the implementation of this procedure.

6.0 Equipment and Supplies

The depth at which samples will be collected and the anticipated method of sample collection (direct-push, split-spoon, hand auger, shovel, or test pits) will be presented in the SAP. The following details equipment typically needed for soil sampling, based on the various methods. See the SAP for specific detail of equipment and supply needs.

6.1 Depending on the nature of suspected contamination, field screening instrumentation may be used for direct sampling. Appropriate instrumentation and calibration standards should be available. If volatile organic contaminants are suspected and a PID will be used, refer to the equipment and instrumentation listed in SOP 3-20 Operation and Calibration of a Photoionization Detector. Equipment in this SOP includes but is not limited to:

- PID/FID;
- Calibration gas; and
- Tedlar® gas bags (for calibration).

6.2 If field screening methods include jar headspace screening for volatile organics, refer to the equipment and procedure in SOP 3-19 Headspace Screening for Total VOCs. Equipment in this SOP includes but is not limited to:

- Clean soil (“drillers jars”) jars; and
- Aluminium foil.

6.3 Appropriate decontamination procedures must be followed for sampling equipment. Refer to SOP 3-06 Equipment Decontamination. Equipment in this SOP includes but is not limited to:

- Phosphate-free detergent;
- Isopropyl Alcohol;
- Tap water;
- Deionized Ultra-Filtered (DIUF) Water;
- Plastic buckets or washbasins;
- Brushes; and
- Polyethylene sheeting.

6.4 The following general equipment is needed for all soil sampling, regardless of method:

- Stainless steel bowls;
- Stainless steel trowels;
- Appropriate sample containers for laboratory analysis;
- Personal Protective Equipment (PPE);
- Logbook;
- Cooler and ice for preservation; and
- Stakes and flagging to document sampling location.

6.5 The following additional equipment is needed for volatile organic sampling:

- Electronic pan scale and weights for calibration; and
- Syringes or other discrete soil core samplers.

6.6 The following additional equipment may be needed for surface and test pit soil sampling:

- Hand Auger

6.7 The following additional equipment may be needed for soil sampling from direct push and/or split-spoon equipment:

- Tape measure or folding carpenter's rule for recording the length of soil recovered.

Note: All subsurface drilling equipment will be provided and maintained by the subcontractor.

7.0 Procedure

7.1 General Soil Sampling Procedure for All Soil Sampling Methods

7.1.1 Record the weather conditions and other relevant on-site conditions.

7.1.2 Select the soil sampling location, clear vegetation if necessary, and record the sampling location identification number and pertinent location details.

7.1.3 Verify that the sampling equipment is properly decontaminated, in working order, and situated at the intended sampling location.

7.1.4 Place polyethylene sheeting on the ground and assemble all necessary sampling equipment on top of it. Cover surfaces onto which soils or sampling equipment will be placed (i.e. tables with polyethylene sheeting).

7.1.5 Follow the appropriate procedures listed below for either surface, split-spoon, direct push, or test pit sample collection (7.2, 7.3, 7.4, and 7.5 respectively).

7.1.6 Collect soil samples according to procedures listed in Section 7.6 depending on project specific analyses.

7.1.7 Record date/time, sample ID, and sample descriptions in the field logbook or field form. A sketch or description of the location may also be recorded so the sample location can be re-constructed, especially if the location will not be recorded using global positioning satellite (GPS) equipment.

7.1.8 Immediately label the sample containers and place them on ice, if required for preservation. Complete the chain-of-custody form(s) as soon as possible.

7.1.9 Dispose of all excess excavated soil in accordance with the SAP.

7.1.10 If required, mark the sample location with a clearly labelled wooden stake or pin flag. If the location is on a paved surface, the location may be marked with spray paint.

7.1.11 Decontaminate the sampling equipment according to SOP 3-06 Equipment Decontamination.

7.2 **Surface Sampling**

7.2.1 The criteria used for selecting surface soil locations for sampling may include the following:

- Visual observations (soil staining, fill materials);
- Other relevant soil characteristics;
- Site features;
- Screening results;
- Predetermined sampling approach (i.e. grid or random); and
- Sampling objectives as provided in the SAP.

7.2.2 The following procedures are to be used to collect surface soil samples. Surface soils are considered to be soils that are up to two feet below ground surface, though state regulations and project objectives may define surface soils differently; therefore, the SAP should be consulted for direction on the depth from which to collect the surface soil samples. Sampling and other pertinent data and information will be recorded in the field logbook and/or on field forms. Photographs may be taken as needed or as specified in the SAP.

1. Gently scrape any vegetative covering until soil is exposed. Completely remove any pavement.
2. Remove soil from the exposed sampling area with a trowel, hand auger, or shovel. Put soils within the sampling interval in a stainless steel bowl for homogenizing. Monitor the breathing zone and sampling area as required in the HASP.
3. For VOC analyses, collect representative soil samples directly from the recently-exposed soil using a syringe or other soil coring device (e.g., TerraCore®, EnCore®). Follow procedures in Section 7.6.1 for VOC sampling.
4. Collect sufficient soil to fill all remaining sample jars into a stainless steel bowl. Homogenize the soil samples to obtain a uniform soil composition which is representative of the total soil sample collected according to the following procedure:

   a) Remove all rocks and non-soil objects using a stainless steel spoon or scoop.

b) Form a cone shaped mound with the sample material, then flatten the cone and split the sample into quarters.

c) Use the stainless steel spoon/scoop to mix the quarter samples that are opposite.

d) After mixing the opposite quarters, reform the cone shaped mound.

e) Repeat this procedure a minimum of five (5) times, removing any non-soil objects and breaking apart any clumps.

7.3 Split-Spoon Sampling

7.3.1 At each boring location, the frequency and depth of split-spoon samples will be determined from the SAP. Split-spoon samples may be collected continuously, intermittently, or from predetermined depths.

7.3.2 Split-spoon samplers shall be driven into undisturbed soil by driving the spoon ahead of the drill augers/casing. In cohesive soils, or soils where the borehole remains open (does not collapse), two split-spoon samples may be taken prior to advancing the augers/casing.

7.3.3 After split-spoons are retrieved, open the split-spoon and measure the recovery of soil. If a PID will be used for screening, immediately scan the recovered sample for VOCs using the PID. Scan the recovered soil boring by making a hole in the soil with a decontaminated trowel and placing the PID inlet very close to the hole. Be very careful not to get soil on the tip of the PID. Take PID readings every 6 inches along the split-spoon and/or in any areas of stained or disturbed soil. Record the highest PID reading and the depth at which it was observed along with all other pertinent observations. If required in the SAP, VOC and headspace samples should be collected (see Section 7.6.1) prior to logging the sample.

7.3.4 If headspace screening for VOCs is required in the SAP, collect a soil sample (as defined in the SAP) and perform headspace screening according to SOP 3-19 Headspace Screening for Total VOCs.

7.3.5 Soils collected using the split-spoon sampler will be logged by the field representative using the procedure required in the SAP.

7.3.6 Collect the remainder of the sample volume required into a stainless steel bowl. Homogenize the soil so the material is uniform in composition and representative of the total soil sample collected. Follow homogenizing techniques as described in Section 7.2.

7.3.7 The SAP may specify that intervals to be sent to the laboratory be determined by visual observation and/or highest PID screening or headspace results, which can only be determined once the boring is complete. In this instance, a VOC sample should be collected at each interval. The remainder of the soil from that interval will be set aside in a clearly labelled stainless steel bowl covered with aluminium foil. Once the boring has been completed and the sample interval has been determined, the remainder of the soil can be homogenized according to Section 7.2 and submitted for laboratory analysis.

7.3.8 Once a boring is complete and all required samples have been collected, the boring must be completed as specified in the SAP (e.g., completed as a monitoring well, backfilled with bentonite, etc).

7.4 Direct Push Sampling

At each boring location, the frequency of direct-push samples will be determined from the SAP. Typically, samples with direct-push equipment are collected in 4 foot (ft) intervals, but smaller (e.g., 2 ft) and larger (e.g., 5 ft) intervals are also possible.

1. Sample using Macro-Core samplers with acetate liners to obtain discrete soil samples at the depths specified in the SAP.

2. Cut open the acetate liner. If required in the SAP, immediately scan the recovered soil boring for VOCs using a PID by making a hole in the soil with a decontaminated trowel and placing the PID inlet very close to the hole. Be very careful not to get soil on the tip of the PID. Take PID readings every 6 inches along the split-spoon and/or in any areas of stained or disturbed soil. Record the

highest PID reading and the depth at which it was observed along with all other pertinent observations. VOC and headspace samples, if required in the SAP should be collected (see Section 7.6.1) prior to logging the sample.

3. If required in the SAP, collect a soil sample (as defined in the SAP) and perform headspace screening according to SOP 3-19 Headspace Screening for Total VOCs.
4. Soils collected using the direct-push sampler will be logged by the by the field representative using the procedure required in the SAP.
5. Collect the remainder of the sample into a stainless steel bowl. Homogenize the soil collected so that the material is uniform in composition and representative of the total soil sample collected. Follow homogenizing techniques as described in Section 7.2.
6. Once a boring is complete and all required samples have been collected, the boring must be completed as specified in the SAP (e.g., completed as a monitoring well, backfilled with bentonite, etc).

7.5 Test Pit Sampling

7.5.1 Excavate the test pit to the desired depth.

7.5.2 Using the excavator bucket, collect soil samples as specified in the SAP. Collect a sample and perform screening analyses as required by the SAP. If VOCs contamination is suspected, perform headspace screening according to SOP 3-19 Headspace Screening for Total VOCs.

7.5.3 Collect the sample from center of the bucket to avoid potential contamination from the bucket.

7.5.4 VOC samples should also be collected from an undisturbed section soil in the excavator bucket. The top layer of exposed soil should be scraped away just prior to collecting the VOC samples.

7.5.5 Collect the remainder of the sample volume required into a stainless steel bowl. Homogenize the soil so the material is uniform in composition and representative of the total soil sample collected. Follow homogenizing techniques as described in Section 7.2.

7.5.6 Dispose of all excavated soil according to the SAP.

7.6 Sample Collection Methods

7.6.1 Volatile Organics Sampling

For soils collected for analyses of volatile organics, including Volatile Petroleum Hydrocarbons (VPH) or other purgable compounds, a closed system is maintained. From collection through analysis, the sample bottles are not opened. The bottle kit for a routine field sample for these analyses will typically include three 40-mL VOA vials and one soil jar. Two 40-mL VOA vials will contain either 5 mL reagent water or 5 mL sodium bisulfate and magnetic stir bars (i.e., low level vials). The third VOA vial will contain 15 mL methanol with no magnetic stir bar (i.e., high level vial). These vials are usually provided by the laboratory and are pre-weighed, with the tare weight recorded on the affixed sample label. No additional sample labels are affixed to the VOA vials, as addition of a label would alter the vial weight. All information is recorded directly on the sample label using an indelible marker. The soil jar is provided for percent solids determination. For VOC or VPH analyses, samples are collected prior to sample homogenization. Collect the VOC sample in accordance with the procedure described below.

1. Determine the soil volume necessary for the required sample weight, typically 5 grams:
   a) Prepare a 5 mL sampling corer (e.g., Terra Core®) or cut-off plastic syringe.
   b) Tare the sampler by placing it on the scale, and zeroing the scale.
   c) Draw back the plunger to the 5 gram mark or 5mL (5cc) mark on cut-off syringe, and insert the open end of the sampler into an undisturbed area of soil with a twisting motion, filling the

sampler with soil. Note the location of the plunger with respect to the milliliter (cc) or other graduation printed on the sampler.

d) Weigh the filled sampler, and remove or add soil until the desired weight is obtained. Note the location of the plunger which corresponds to this weight. Do not use this sample for laboratory analysis.

2. Once the required soil volume has been determined, pull the plunger back to this mark and hold it there while filling the syringe for each sample.

3. Collect 5 grams of soil using the cut-off syringe or Terra Core® sample device. Extrude the 5-grams of soil into one of the low level 40-mL VOA vials. Quickly wipe any soil from the threads of the VOA vial with a clean Kimwipe® and immediately close the vial. It is imperative that the threads be free from soil or other debris prior to replacing the cap on the vial in order to maintain the closed system necessary for the analysis.

4. Gently swirl the vial so that all of the soil is fully wetted with the preservative.

5. Fill the other low level 40 mL VOA vial in this manner.

6. Repeat the process for the high level VOA vials, only for the high level VOA vial three 5 gram aliquots (i.e., 15 grams total) should be extruded into the high level VOA vial.

   NOTE: Depending on the laboratory, some high level VOA vials only contain 5 mL or 10 mL of methanol. If this is the case, either 5 grams total or 10 grams total, respectively, should be extruded into the high level VOA vial. In other words, the mass of soil in grams should be identical to the volume of methanol in mL (i.e., 1:1 ratio of soil to methanol).

7. Collect any additional QC sample collected (e.g., field duplicate, MS, and MSD) in the same manner as above.

8. Fill the 4-oz glass jar with soil from the same area for percent moisture determination.

7.6.2 Soil Sampling Method (All other analyses except VOC/VPH)

When all the required soil for a sampling location has been obtained, the soil can be homogenized as described in section 7.2. Collect sufficient volume to fill all of the remaining sample containers at least ¾ full for all other analyses. Homogenize the soil in a decontaminated stainless steel bowl, removing rocks, sticks, or other non-soil objects and breaking apart any lumps of soil prior to filling the remaining sample containers.

NOTE: Soil samples must contain greater than 30% solids for the data to be considered valid.

8.0 Quality Control and Assurance

8.1 Sampling personnel should follow specific quality assurance guidelines as outlined in the SAP. Proper quality assurance requirements should be provided which will allow for collection of representative samples from representative sampling points. Quality assurance requirements outlined in the SAP typically suggest the collection of a sufficient quantity of field duplicate, field blank, and other samples.

8.2 Quality control requirements are dependent on project-specific sampling objectives. The SAP will provide requirements for equipment decontamination (frequency and materials), sample preservation and holding times, sample container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

9.0 Records, Data Analysis, Calculations

All data and information (e.g., sample collection method used) must be documented on field data sheets, boring logs, or within site logbooks with permanent ink. Data recorded may include the following:

- Weather conditions;
- Arrival and departure time of persons on site;
- Instrument type, lamp (PID), make, model and serial number;
- Calibration gas used;
- Date, time and results of instrument calibration and calibration checks;
- Sampling date and time;
- Sampling location;
- Samples collected;
- Sampling depth and soil type;
- Deviations from the procedure as written; and
- Readings obtained.

10.0 Attachments or References

SOP 3-06, Equipment Decontamination

SOP 3-19, Headspace Screening for Total VOCs

SOP 3-20, Operation and Calibration of a Photoionization Detector

Author	Reviewer	Revisions (Technical or Editorial)
Robert Shoemaker Senior Scientist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Sediment Sampling

Procedure 3-22

1.0 Purpose and Scope

1.1 Sediment contamination is a widespread environmental problem that can pose a threat to a variety of aquatic ecosystems. Sediment functions as a reservoir for common contaminants such as pesticides, herbicides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and metals such as lead, mercury, and arsenic. Contaminated sediments represent a hazard to aquatic life through direct toxicity, as well as to aquatic life, wildlife, and human health through bioaccumulation. Accurate assessment of environmental hazards posed by sediment contamination depends in large part on the accuracy and representativeness of sediment collection and analyses (U.S. EPA, 2001).

1.2 Selection and proper use of sediment sampling equipment is essential to the collection of accurate, representative sediment data that will meet the project Data Quality Objectives (DQOs). Most sediment collection devices are designed to isolate and consistently retrieve a specified volume and surface area of sediment, from a required depth below the sediment surface, with minimal disruption of the integrity of the sample and no contamination of the sample. Maintaining the integrity of the collected sediment, for the purposes of the measurements intended, is a primary concern in most studies because disruption of the sediment's structure could change its physiochemical and biological characteristics, thereby influencing the bioavailability of contaminants and the potential toxicity of the sediment (U.S. EPA, 2001).

When selecting the type of sediment sampling equipment to be used for an event, the project DQOs as well as the sediment characteristics should be considered. Related to the project DQOs is the desired depth of sediment sampling. For monitoring and assessment studies where historical contamination is not the focus, the upper 10 to 15 centimeters (cm) is typically the horizon of interest, as this is the horizon that generally contains the most recently deposited sediments and most epifaunal and infaunal organisms (U.S. EPA, 2001). The 0-6 inches interval for sediments with less than two feet of water is also used for human health risk assessment purposes. Sampling of these horizons can usually be done with grab samplers. However, if sediment contamination is being related to organism exposures (e.g. benthic macroinvertebrates and/or fish), or if characterization of deeper sediments is important for comparison of recent surficial versus historical contamination, then more precise sampling of sediment depths might be needed, and a hand corer may be more suitable (U.S. EPA, 2001).

1.3 This standard operating procedure (SOP) describes the procedure for the collection of sediment samples using the Petite Ponar® Grab Sampler, Ekman Bottom Grab Sampler, and Wildco® Hand Corer (or similar sampling devices). The applicability of each of the sediment samplers is described below.

The Petite Ponar® Grab Sampler is used to collect sediment samples in:

- Firm, hard bottoms such as sand, gravel, consolidated marl, and clay
- Mixtures of sand, stones, and coarse debris
- Soft or mucky sediments

The Ekman Bottom Grab Sampler is used to collect sediment samples in:

- Soft, finely divided littoral bottoms free from vegetation and intermixtures of sand, stones, and other coarse debris
- Bottoms composed of finely divided mulch, mud, muck, or submerged fine peaty materials

The Wildco® Hand Corer is used:

- To collect sediment samples for geological characterizations and dating
- To collect sediment samples for programs where it is important to maintain an oxygen-free environment for the sample during collection
- To collect sediment samples from a deeper depth than a grab sampler, and to characterize the depth of contamination at a site
- To investigate the historical input of contaminants to aquatic systems
- To collect sediment samples in semi-consolidated and soft sediment

Pictures and exploded diagrams of the Petite Ponar Grab Sampler, Ekman Bottom Grab Sampler, and Wildco® Hand Corer are presented in Figures 1, 2, and 3, respectively.

1.4 This procedure is the Program-approved professional guidance for work performed by Resolution Consultants under the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract (Contract Number N62470-11-D-8013).

1.5 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

2.0 Safety

2.1 Depending upon the site-specific contaminants, various protective programs must be implemented prior to sampling the first location. All **field sampling personnel** responsible for sampling activities must review the project-specific health and safety plan (HASP) paying particular attention to the control measures planned for the sampling tasks. Conduct preliminary area monitoring of sample locations to determine the potential hazard to field sampling personnel. If significant contamination is observed, minimize contact with potential contaminants in both the vapor phase and solid or liquid matrix through the use of respirators and disposable clothing.

2.2 Observe standard health and safety practices according to the project-specific HASP. Suggested minimum protection during sediment sampling activities includes inner disposable vinyl gloves, outer chemical-protective nitrile gloves, and waders (if applicable). Refer to the project-specific HASP for the required PPE.

2.3 Handle all sediments removed from potentially contaminated locations in accordance with the IDW handling procedures in SOP 3-05, IDW Management.

2.4 Depending upon the type of contaminant expected or determined in previous sampling efforts, employ the following safe work practices:

- If sampling from a boat, all sampling personnel should wear personal flotation devices (PFDs) when in the boat, and should follow all health and safety protocols for working in a boat presented in the project-specific HASP.
- Lifting the samplers into the boat, dumping its contents, and washing those contents may require leaning over the side of the boat. Care should be taken to keep the boat in proper balance at all times during sampling.
- Severe injury to fingers or hands can be caused by movement of the lever arms of the Petite Ponar® Grab Sampler. Do not handle or move the Petite Ponar® Grab Sampler unless the safety pin is fully inserted in the locking holes.
- Severe injury to fingers or hands can be caused by the closing of the sharpened scoops of the Ekman Bottom Grab Sampler. Handle the Ekman Bottom Grab Sampler very carefully when the springs are set and the cable loops are hooked (armed) on the Twin-Pin™ pins on the release mechanism. Do not “arm” the Ekman Bottom Grab Sampler until the sampler is ready

to be used. The Ekman Bottom Grab Sampler spring-loaded jaws are potentially dangerous; extreme care must be exercised when setting the jaws. To prevent injury (and to extend the life of the springs), unhook both springs from their scoop buttons after each sampling session.

3.0 Terms and Definitions

None.

4.0 Training and Qualifications

4.1 The **Contract Task Order (CTO) Manager** is responsible for ensuring that sediment sampling activities comply with this procedure. The **CTO Manager** is responsible for ensuring that all field sampling personnel involved in sediment sampling shall have the appropriate education, experience, and training to perform their assigned tasks.

4.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

4.3 The **Field Manager** is responsible for ensuring that all field sampling personnel follow these procedures.

4.4 **Field sampling personnel** are responsible for the implementation of this procedure.

4.5 The field sampler and/or task manager is responsible for directly supervising the sediment sampling procedures to ensure that they are conducted according to this procedure, and for recording all pertinent data collected during sampling.

5.0 Equipment and Supplies

5.1 For sediment sampling using all types of equipment, the following supplies are required:

- Stainless steel bowls
- Stainless steel hand trowels, spoons, spatulas, and scoops
- Munsell Color Chart
- Particle size chart

5.2 Petite Ponar® Grab Sampler

- 3/16” braided polyester line
- Auxiliary weights

5.3 Ekman Bottom Grab Sampler

- 11 oz split messenger
- 3/16” braided polyester line
- Extension Handle
- Auxiliary weights

5.4 Wildco® Hand Corer

- 3/16” braided polyester line
- Extension handle
- Stainless steel core catchers (for normal sediments)
- Eggshell™ core catchers (for wet sediments)
- Stainless steel nose piece
- Cellulose acetate butyrate (CAB) liners
- Core liner end caps
- Core liner cutter
- Geologists table

- Auxiliary weights

6.0 Procedure

6.1 Depending on the characteristics of the site being investigated, sediment samples may be collected from a boat, or by sampling personnel in waders. In all instances, sediment sampling should begin from the most downstream location and proceed to the most upstream location. If sediment samples are collocated with surface water samples, the surface water sample should be collected prior to the sediment sample in order to avoid increased turbidity from displaced sediment. Regardless of the type of sediment sampling equipment used, documentation of field observations and collection activities should be recorded on the sediment sampling sheet or electronic data collection device. The following observations should be recorded on the sediment sampling form (see Attachment 1) for all sediment sampling activities:

- Sample location
- Weather conditions and other relevant site conditions
- Depth of water to the nearest 0.1 foot. A surveyor rod may be used. If the surveyor rod is used, minimize water turbulence and do not disturb any sediment.
- Physical characteristics of the water body such as estimated current speed (stagnant, slow, medium, or fast) and direction, odor, color, presence of any dead vegetation, surface sheens, etc.
- Sediment color according to the Munsell Color Chart
- Sediment grain size according to a particle size chart

Specific procedures for the collection of sediment samples using the Petite Ponar® Grab Sampler, Ekman Bottom Grab Sampler, and Wildco® Hand Corer are presented below.

6.2 Petite Ponar® Grab Sampler

6.2.1 Inspect the sampler to ensure all parts are in good working condition.

6.2.2 Decontaminate the sampler according to the procedures in SOP 3-06, Equipment Decontamination.

6.2.3 Attach the 3/16” braided polyester line to the sampler by looping the line through the clevis at the top center of the lever arms and tying securely. Tie the other end of the line to the boat (if applicable), or make sure to hold on to the other end of the line. Strong, tight knots (e.g. bowline, two half hitches) are essential for operator safety and to prevent losing the sampler. If necessary, attach the auxiliary weights to the sampler according the manufacturer’s directions.

6.2.4 Insert the Pinch-Pin™ into its hole in the lever arms, making sure to firmly push the Pinch-Pin™ into the hole. As long as the line is taught, the Pinch-Pin™ will stay in its place. When the line becomes the least bit slack (e.g. when the sampler hits the bottom), the Pinch-Pin™ spring will force the Pinch-Pin™ out of its hole, allowing the scoops to close.

6.2.5 Just before lowering the grab into the water, and with the line taught, remove the safety pin so the closing mechanism will release when the sampler is on the bottom. Make sure to keep the line taught, as any loss of tension in the line will cause the Pinch-Pin™ to pop out, closing the sampler.

6.2.6 Lower the sampler into the water in a slow and controlled fashion, especially during the final 1-2’, such that the bow wave is minimized, thus minimizing the dispersal of fine material on the sediment surface. At no time should the sampler be allowed to “free fall” down through the water column.

6.2.7 Once the sampler has reached the bottom, release the tension on the line, and allow the sampler to sink into the sediment momentarily. The release of tension on the line will cause the Pinch-Pin™ to pop out.

6.2.8 Collect the sample by pulling on the line, which will cause the lever arms to drive the scoops into the sediment in a closing motion. Keep pulling on the line in a controlled fashion until the scoops drive through the sediment and close.

6.2.9 Once the sampler scoops have closed, continue pulling on the line in a controlled fashion in order to retrieve the sampler back to the surface. When the sampler reaches the surface, lift it clear and bring it above a decontaminated stainless steel bowl. Inspect the sampler to ensure that an acceptable sample has been collected (See Figure 4). If the sample is not acceptable, discard the sample in an area that is not proximal or upstream to the area or subsequent areas that are being sampled.

6.2.10 Prior to sampling and sample homogenization, the overlying water in the sampler should be siphoned off, and not decanted (U.S. EPA 2001).

6.2.11 If acid volatile sulfide/simultaneously extracted metals (AVS/SEM) samples are to be collected, open the top screens of the sampler and collect the AVS/SEM sample directly from the sediment contained in the sampler according to the procedures specified in the project-specific SAP.

6.2.12 If volatile organic compound (VOC) samples are to be collected, open the top screens of the sampler and collect the VOC samples by inserting a syringe, Terra Core sampler, or other VOC sampling device directly into the undisturbed sediment contained within the sampler, making sure to follow all VOC sampling procedures specified in the project-specific SAP. Once the VOC samples have been collected, collect an additional aliquot for the VOC percent solids sample directly from the undisturbed sediment contained within the sampler.

6.2.13 Once the AVS/SEM and VOC samples have been collected (or if AVS/SEM and VOC samples are not required), open the sampler by pulling the two scoops open, taking care to keep hands and fingers away from the sharpened edges of the scoops, and allow the sediment to exit the sampler into the decontaminated stainless steel bowl.

6.2.14 If additional aliquots are necessary to provide adequate sample volume, repeat steps 6.2.3 through 6.2.12 until an adequate sample volume has been collected, taking care to deploy the sampler to an area that is proximal and upstream, but not on top of, the previous sample location.

6.2.15 Once an adequate sample volume has been collected, homogenize the sample in the stainless steel bowl, record the sediment sample information on the Sediment Sample Collection Form (see Attachment 1), and collect the sediment samples according to the procedures specified in the project-specific SAP (typically in order of decreasing volatility).

6.3 Ekman Bottom Grab Sampler with the 11 oz Split Messenger

6.3.1 Inspect the sampler to ensure all parts are in good working condition.

6.3.2 Decontaminate the sampler according to the procedures in SOP 3-06, Equipment Decontamination.

6.3.3 Attach the 3/16" braided polyester line to the sampler by passing the line through the trip mechanism and knotting it securely below the underlying plate. Thread the 11 oz split messenger on the line, and tie the other end of the line to the boat (if applicable), or make sure to hold on to the other end of the line. Strong, tight knots (e.g. bowline, two half hitches) are essential to prevent losing the sampler. If necessary, attach the auxiliary weights to the sampler according the manufacturer's directions.

6.3.4 Set the spring on the side of the sampler by hooking the end of the spring onto one scoop button and stretching the spring to reach the second scoop button. Repeat this procedure with the spring on the other side of the sampler.

6.3.5 Arm the scoops by hooking one cable loop to one Twin-Pin™ pin in the trip assembly on the top of the sampler. The white ball on the cable can be used as a hand grip to assist getting the cable loop hooked onto the Twin-Pin™ pin. Repeat for the opposite cable loop. The sampler is now armed and dangerous. Do not allow anything to come in contact with the trip assembly at the top of the sampler, as this may cause a sudden and unexpected closure of the sampler.

6.3.6 Lower the sampler into the water in a slow and controlled fashion, especially during the final 1-2', such that the bow wave is minimized, thus minimizing the dispersal of fine material on the sediment surface. At no time should the sampler be allowed to "free fall" down through the water column.

6.3.7 Once the sampler has reached the bottom, allow the sampler to settle momentarily. Once the sampler has settled, hold the line with just enough tension to keep it straight, and send the 11 oz split messenger down the line. Once the 11 oz split messenger impacts Twin-Pin™ strike pad in the trip assembly on the top of the sampler, the two cable loops will be released from the Twin-Pin™ pins, and the spring-loaded scoops of the sampler will automatically close.

6.3.8 Retrieve the sampler by pulling up the line in with a moderate, steady speed. When the sampler reaches the surface, lift it clear and bring it above a decontaminated stainless steel bowl. Inspect the sampler to ensure that an acceptable sample has been collected (See Figure 4). If the sample is not acceptable, discard the sample in an area that is not proximal or upstream to the area or subsequent areas that are being sampled.

6.3.9 Prior to sampling and sample homogenization, the overlying water in the sampler should be siphoned off, and not decanted (U.S. EPA 2001).

6.3.10 If AVS/SEM samples are to be collected, open the top lids of the sampler and collect the AVS/SEM sample directly from the sediment contained in the sampler according to the procedures specified in the project-specific SAP.

6.3.11 If VOC samples are to be collected, open the top lids of the sampler and collect the VOC samples by inserting a syringe, Terra Core sampler, or other VOC sampling device directly into the undisturbed sediment contained within the sampler, making sure to follow all VOC sampling procedures specified in the project-specific SAP. Once the VOC samples have been collected, collect an additional aliquot for the VOC percent solids sample directly from the undisturbed sediment contained within the sampler.

6.3.12 Once the AVS/SEM and VOC samples have been collected (or if AVS/SEM and VOC samples are not required), open the sampler by pulling on the white balls on both cables, opening the spring-loaded scoops and allowing the sediment to exit the sampler into the decontaminated stainless steel bowl. While the spring-loaded scoops are being held open, do not place hands or fingers inside or underneath the sampler.

6.3.13 If additional aliquots are necessary to provide adequate sample volume, repeat steps 6.3.4 through 6.3.11 until an adequate sample volume has been collected, taking care to deploy the sampler to an area that is proximal and upstream, but not on top of, the previous sample location.

6.3.14 Once an adequate sample volume has been collected, homogenize the sample in the stainless steel bowl, record the sediment sample information on the Sediment Sample Collection Form (see Attachment 1), and collect the sediment samples according to the procedures specified in the project-specific SAP (typically in order of decreasing volatility).

6.4 Ekman Bottom Grab Sampler with the Extension Handle

6.4.1 Inspect the sampler to ensure all parts are in good working condition.

6.4.2 Decontaminate the sampler according to the procedures in SOP 3-06, Equipment Decontamination.

6.4.3 Attach the extension handle to the top of the sampler with machine bolts.

6.4.4 Arm the sampler according to the procedures described in steps 6.3.3 and 6.3.4 above.

6.4.5 Using the extension handle, lower the sampler to a point 4-6" above the sediment surface, and drop the sampler to the sediment, keeping the sampler vertical at all times.

6.4.6 Trigger the trip assembly by depressing the button on the upper end of the extension handle. This will cause the two cable loops to be released from the Twin-Pin™ pins, and the spring-loaded scoops of the sampler will automatically close.

6.4.7 While keeping the sampler vertical, bring the sampler over to a decontaminated stainless steel bowl. Inspect the sampler to ensure that an acceptable sample has been collected (See Figure 4). If the sample is not acceptable, discard the sample in an area that is not proximal or upstream to the area or subsequent areas that are being sampled.

6.4.8 Collect samples according to the procedures described in steps 6.3.8 through 6.3.13 above.

6.5 Wildco® Hand Corer with the Push Handles

6.5.1 Inspect the sampler to ensure all parts are in good working condition:

- Assemble and disassemble the core tube from the head and nose piece to make sure the threads are not binding. If the threads are binding, consult the manufacturer's directions.
- Make sure that the CAB plastic liner can slide easily in and out of the core tube.
- Make sure the bottom edge of the core tube and nose piece are sharp and free from nicks or dents. If necessary, file smooth using a round file.
- Check the flutter valve for ease of movement.
- Check the flutter valve seat to make sure it is clear of any obstruction, disfigurement, grease, and/or oil that could prevent a tight closure.

6.5.2 Decontaminate the sampler according to the procedures in SOP 3-06, Equipment Decontamination.

6.5.3 Screw the corer head onto the core tube, and screw the two handles onto the corer head.

6.5.4 Insert a CAB plastic liner into the core tube, insert a core catcher onto the end of the CAB plastic liner (stainless steel for normal sediments, Eggshell™ for wet sediments), and screw the stainless steel nose piece onto the core tube. If using the hand corer from a boat, bridge, high dock, etc., be sure that the appropriate extension handle (5', 10' or 15') is attached to the corer head.

6.5.5 Get in position over the sampling location. If wading in shallow water, be sure to approach the sample location from the downstream side. Line up the sampler, aiming it vertically for the point where the sample is being taken, and push the hand corer in a smooth continuous motion through the water and into the sediment. Increase the thrust as necessary to obtain the penetration desired. Do not hammer or pound the corer into the sediment.

6.5.6 Retrieve the sample by pulling straight up on the handles, keeping the corer as vertical as possible. If the corer has not been completely submerged, close the flutter valve by hand and press it shut while the sample is being retrieved. The flutter valve must be kept very wet if it is to seal properly and prevent sample washout. If the substrate is gripping the corer too tightly, gently rock the top of the corer back and forth horizontally to increase the size of the hole created by the corer and reduce the pull-out suction.

6.5.7 Unscrew the nose piece from the corer and cap the bottom end of the CAB core liner. Release the flutter valve to free the CAB core liner, and slide the CAB core liner from the core tube. Cap the top of the CAB core liner and inspect the CAB core liner for recovery. If the recovery is adequate, proceed to step 6.5.8. If the recovery is not adequate, resample the location by repeating steps 6.5.3 through 6.5.7.

6.5.8 Bring the CAB core liner with the sediment sample over to the geologist table, keeping the core vertical. Place the CAB core liner on the geologist table and cut open with a core liner cutter. If AVS/SEM samples are to be collected, collect the AVS/SEM sample directly from the sediment contained in the core liner according to the procedures specified in the project-specific SAP. If VOC samples are to be collected, collect the VOC samples by inserting a syringe, Terra Core sampler, or other VOC sampling device directly into the sediment core. Consult the project-specific SAP for project-specific VOC sediment sampling procedures. Once the VOC samples have been collected, collect an additional aliquot for the VOC percent solids sample directly from the sediment core.

6.5.9 Once the AVS/SEM and VOC samples have been collected (or if AVS/SEM and VOC samples are not required), use a decontaminated stainless steel spoon to transfer the remaining sediment core into a decontaminated stainless steel bowl.

6.5.10 If additional aliquots are necessary to provide adequate sample volume, repeat steps 6.5.3 through 6.5.8 until an adequate sample volume has been collected, taking care to deploy the corer to an area that is proximal, but not on top of, the previous sample location.

6.5.11 Once an adequate sample volume has been collected, homogenize the sample in the stainless steel bowl, record the sediment sample information on the Sediment Sample Collection Form (see Attachment 1), and collect the sediment samples according to the procedures specified in the project-specific SAP (typically in order of decreasing volatility).

6.6 Wildco® Hand Corer with the Clevis and Line

6.6.1 Inspect the corer as described in step 6.5.1 above.

6.6.2 Decontaminate the sampler according to the procedures in SOP 3-06, Equipment Decontamination.

6.6.3 Screw the corer head onto the core tube. Attach the 3/16" braided polyester line to the corer by passing the line through the clevis in the corer head and knotting it securely. Strong, tight knots are essential to prevent losing the corer. If necessary, attach the auxiliary weights to the sampler according the manufacturer's directions.

6.6.4 Insert a CAB plastic liner into the core tube, insert a core catcher onto the end of the CAB plastic liner (stainless steel for normal sediments, Eggshell™ for soupy sediments), and screw the stainless steel nose piece onto the core tube.

6.6.5 Position the corer over the drop point and steady momentarily, making sure to keep the corer vertical at all times. Make sure to arrange the 3/16" braided polyester line to run freely. Since the corer's penetration is by simple gravity, it is important that there be no restraint on the corer during descent by stricture on the line. Keep a firm hold on the free end of the line, or tie it to the boat (if applicable) or some other permanent fixture.

6.6.6 Drop the corer into the water, and allow the corer to free fall until it hits the sediment surface. The corer should not be dropped to depths greater than 20' to 30'. Dropping the corer to depths greater than 20' to 30' may result in the corer striking the sediment surface at an angle less than 90°, resulting in an unsatisfactory sample.

6.6.7 Once the corer has entered the sediment and is no longer falling, draw the line taut, and then pull on the line to pull the corer from the sediment. Once the corer has been pulled free from the sediment, bring the corer back to the surface by pulling up the line, using a smooth, hand-over-hand fashion. This movement automatically causes the flutter valve to close, preventing sample washout in all but the soupiest of sediments.

6.6.8 Once the corer has been returned to the surface, lift the corer clear of the water, being careful to keep the corer as vertical as possible at all times.

6.6.9 Collect the sediment sample according to the procedures outlined in steps 6.5.6 through 6.5.11 above.

7.0 Quality Control and Assurance

7.1 Field personnel will follow specific quality assurance (QA) guidelines as outlined in the project-specific SAP. The goal of the QA program should be to ensure precision, accuracy, representativeness, completeness, and comparability in the project sampling program.

7.2 Quality control (QC) requirements for sample collection are dependent on project-specific sampling objectives. The project-specific SAP will provide requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various QC samples such as trip blanks, field blanks, equipment rinse blanks, and field duplicate samples.

8.0 Records, Data Analysis, Calculations

8.1 Records will be maintained in accordance with SOP 3-03, Recordkeeping, Sample Labelling, and Chain-of-Custody. Various forms are required to ensure that adequate documentation is made of the sample collection activities. These forms may include:

- Sample Collection Records;
- Field logbook;
- Chain-of-custody forms; and
- Shipping labels.

8.2 Sample collection records (Attachment 1) will provide descriptive information for the sediment samples collected at each location.

8.3 The field logbook is kept as a general log of activities and should not be used in place of the sample collection record.

8.4 Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes.

8.5 Shipping labels are required is sample coolers are to be transported to a laboratory by a third party (courier service).

9.0 Attachments or References

Attachment 1 – Sediment Sample Collection Record

Figure 1 – Petite Ponar® Grab Sampler and Exploded Diagram

Figure 2 – Ekman Bottom Grab Sampler (Large, Tall, and Standard Sizes) and Exploded Diagram

Figure 3 – Wildco® Hand Corer (with Case and Accessories) and Exploded Diagram

Figure 4 – Illustrations of Acceptable and Unacceptable Grab Samples

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Wildlife Supply Company. 2004. 1728-G30/ 1728-G40 Petite Ponar® Grab.

SOP 3-05, *IDW Management*.

SOP 3-06, *Equipment Decontamination*.

Author	*Reviewer*	*Revisions (Technical or Editorial)*
Robert Shoemaker Senior Scientist	Chris Barr Program Quality Manager	Rev 0 – Initial Issue (May 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

Attachment 1

Sediment Sample Collection Record

SEDIMENT SAMPLE COLLECTION FORM

Project Name:

Date(s):

Project #:		**Date:**	
Sample Location ID:		**Time:**	
Sample #:		**Weather:**	
Samplers:			

Sample Information:

Sample Depth:		**Sampling Device:**		
Water Depth:				
Distance from River Bank:				
River Flow Rate:				
Field Decon:	Yes No Dedicated	**Sample Type:**	Grab	Composite

Munsell Color:

Sample Description:

Other physical characteristics of water body at sample location:
(Water color, turbidity, odor, presence of sheens, dead\stressed vegetation)

Sample Comments/Description:

Figure 1
Petite Ponar® Grab Sampler and Exploded Diagram

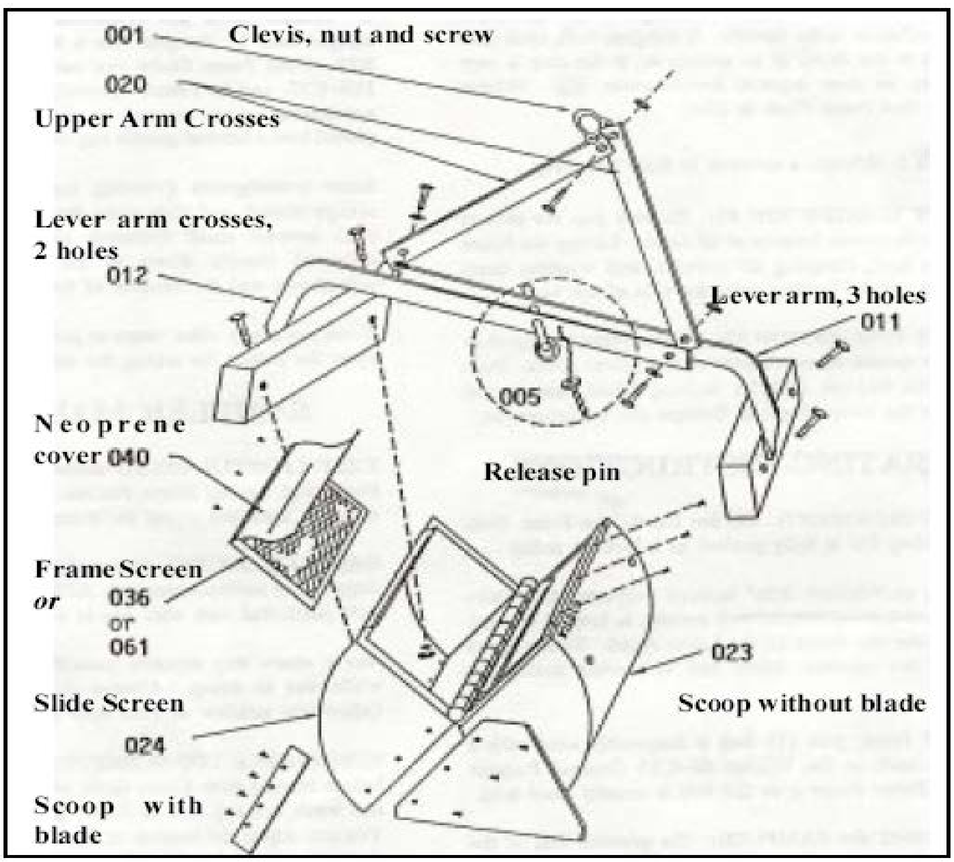
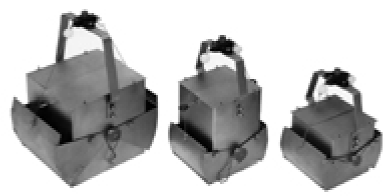


Figure 2

Ekman Bottom Grab Sampler (Large, Tall, and Standard Sizes) and Exploded Diagram



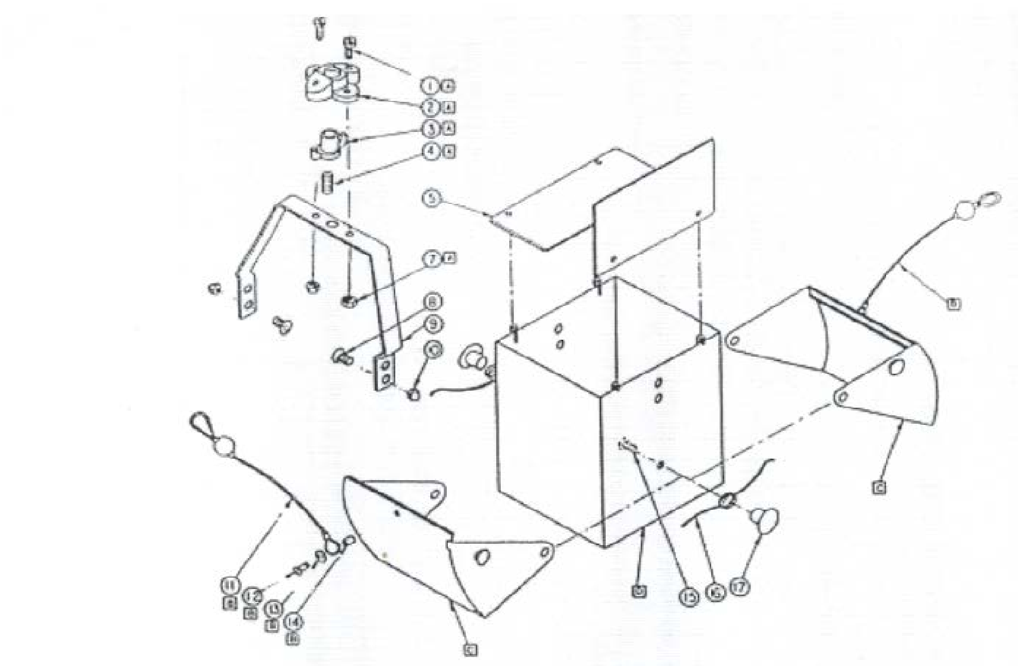
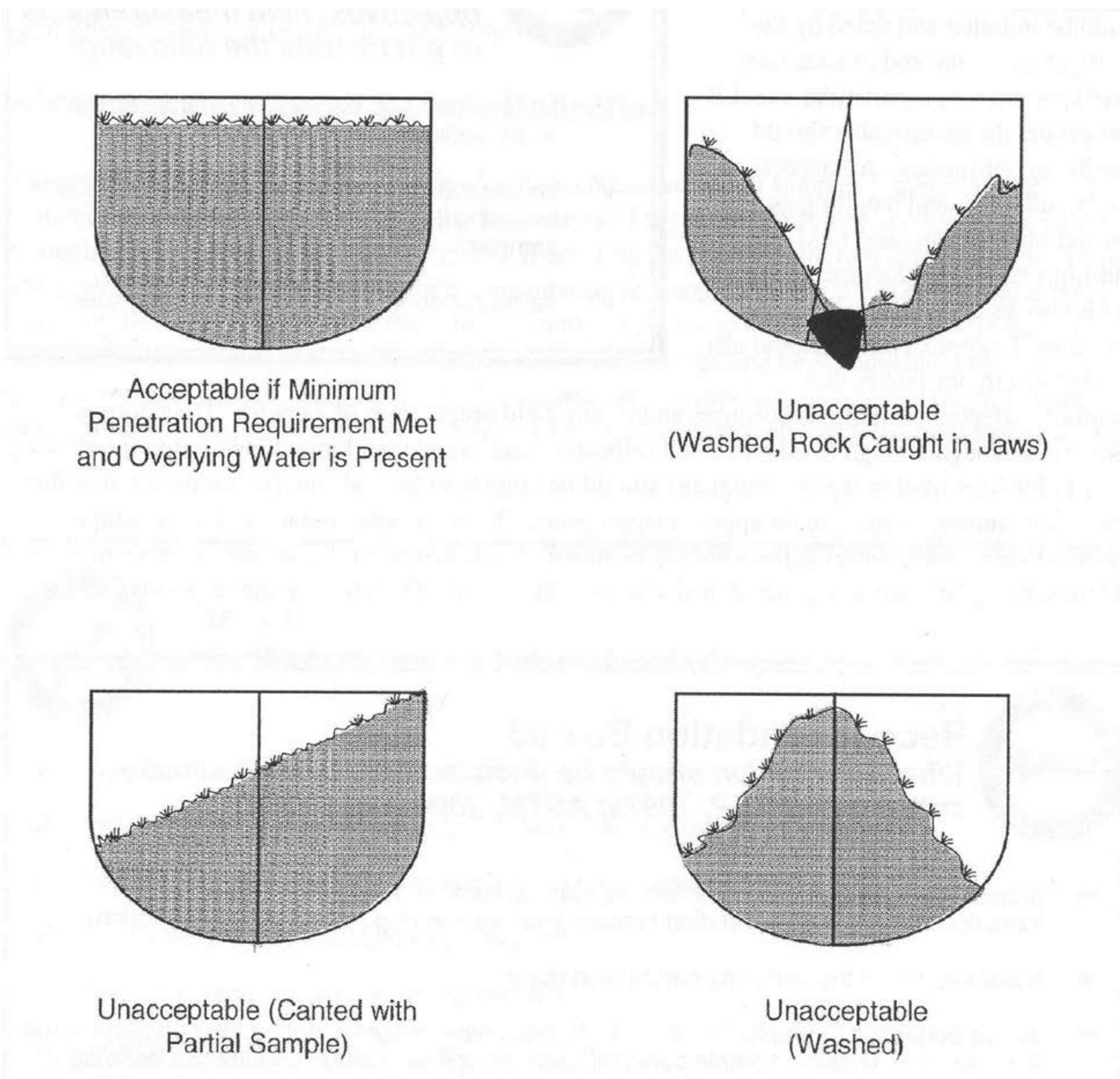


Figure 3
Wildco® Hand Corer (with Case and Accessories) and Exploded Diagram

Figure 4
Illustrations of Acceptable and Unacceptable Grab Samples



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Standard Operating Procedure 3-24
Water Quality Parameter Testing for Groundwater Sampling

AECOM

1.0 PURPOSE

This standard operating procedure (SOP) represents minimum standard of practice. State and federal requirements may vary, and this SOP does not replace state and federal requirements that must be consulted before work begins. Further, if a project-specific work plan has been created, the work plan should be considered the ruling document. This SOP may be modified to meet specific regulatory, client, or project specific criteria.

If there are procedures whether it be from AECOM, state and/or federal that are not addressed in this SOP and are applicable to water quality parameter testing, then those procedures may be added as an appendix to the project-specific Sampling and Analysis Plan (SAP).

2.0 SCOPE

This procedure provides guidance for expected sampling methods and protocols by all personnel related to the measurement of water quality parameters.

Field measurements of water quality parameters are commonly performed to evaluate surface water and groundwater. These tests are often performed to evaluate basic water quality parameters, to evaluate natural attenuation parameters, and to assess the presence of pore water entering a well.

As professional guidance for specific activities, this procedure is not intended to obviate the need for professional judgment during unforeseen circumstances. Deviations from this procedure while planning or executing planned activities must be approved by either the Project Manager or the Quality Assurance (QA) Manager, and documented.

3.0 DEFINITIONS

3.1 Barometric Pressure (BP)

The density of the atmosphere, which varies according to altitude and weather conditions.

3.2 Conductivity/Specific Conductance

A measure of the ability of water to pass electrical current, which increases with the amount of dissolved ionic substances (i.e., salts). Conductivity is inversely related to the resistance of a solution and is measured in units of mhos per centimeter (mhos/cm) (inverse ohms/cm, Siemens/cm). The conductivity of water increases with increasing temperature.

Specific Conductance is corrected for 25 degrees Celsius (°C); for this reason, it is best to record Specific Conductance. If Conductivity is recorded, the temperature of the sample MUST recorded.

3.3 Dissolved Oxygen (DO)

The amount of oxygen present in water and available for respiration. DO is typically measured in milligrams per liter (mg/L). Oxygen is less soluble in warm and salty waters, so the instrument compensates the apparent percent saturation for changes in temperature and conductivity. Most probes measure the current resulting from the electrochemical reduction of oxygen (at a gold cathode) diffusing through a selective membrane. Because oxygen is being removed from the sample to perform the measurement, sample flow is required to prevent false low readings due to depletion of oxygen in the solution in front of the probe. Optical DO probes do not remove oxygen from the sample and are less affected by salts. The common range of DO in groundwater is 0.0 to 3.0 mg/L. Measurements outside of this range suggest that the meter may not be operating correctly.

3.4 Nephelometric Turbidity Unit (NTU)

The measurement of light passing through a sample based on the scattering of light caused by suspended particles.

3.5 pH

A measure of acidity and alkalinity of a solution using a logarithmic scale on which a value of 7 represents neutrality, lower numbers indicate increasing acidity, and higher numbers are increasingly basic.

3.6 Oxidation-Reduction Potential (ORP)

Also known as redox or eH, ORP is a measurement of the potential for a reaction to occur, which generally indicates the oxygen status of a sample. The probe consists of a platinum electrode, the potential of which is measured with respect to a reference electrode that rapidly equilibrates with the potential of the sample solution. A positive value indicates that oxygen is present. A negative value indicates an anaerobic environment or reducing condition. For this reason, negative ORP readings should be associated with DO readings of less than 0.5 mg/l; with negative ORP readings the water may exhibit a sulfur odor or gray color. Positive ORP readings should be associated with DO readings greater than 0.5 mg/L and lack of sulfur odors. Because of the complex relationship between ORP and temperature, no compensation is attempted; it is thus best to report both the ORP and temperature of a water sample.

3.7 Total Dissolved Solids

A measure of the quantity of materials in water that are either dissolved or too small to be filtered.

3.8 Turbidity

Measure of the clarity of water in NTUs. Potable water typically has NTU values between 0.0 and 0.3 NTUs, depending on the state or regulatory program.

4.0 RESPONSIBILITIES

The Porject Manager, or designee, is responsible for ensuring that these standard groundwater sampling activities are followed and shall review all groundwater sampling forms at the conclusion of a sampling event. The CTO Manager is responsible for ensuring that all personnel involved in monitoring well sampling shall have the appropriate education, experience, and training to perform their assigned tasks. The QA Manager or Technical Director is responsible for ensuring overall compliance with this procedure. The Field Manager is responsible for ensuring that all project field staff follows these procedures.

Field sampling personnel are responsible for the implementation of this procedure. Personnel are required to be knowledgeable of the procedures in this SOP. Training and familiarization with this SOP shall be documented in the training file for each employee. The field sampler and/or Field Manager is responsible for directly supervising the calibration procedures to ensure that they are conducted according to this procedure, and for recording all pertinent data. If deviations from the procedure are required because of anomalous field conditions, they must first be approved by the Project Manager, QA Manager, or Technical Director and then documented in the field logbook and associated report or equivalent document.

5.0 PROCEDURES

5.1 Purpose

The procedures will vary depending on parameters being measured, method of sampling, and the method of measurement used. The information here is a general guidance and the site-specific documents and manufacturer manuals supersede these procedures.

5.2 Cautions

Improper use of water quality testing equipment could result in equipment damage or compromised sampling results. Personnel should be trained to operate the test equipment being used for a field operation and should be trained in the proper techniques for collecting and logging water quality parameters. Personnel should also be able to recognize problems with test equipment and have someone available for basic troubleshooting and repair.

5.3 Interferences

During field testing, water quality data that is documented from field testing equipment may be influenced by certain outside factors that are unrelated to the actual site water quality. Such parameters and equipment include the following:

pH Meters

- Coatings of oils, greases, and particles may impair the electrode's response. Pat the electrode bulb dry with lint-free paper or cloth and rinse with de-ionized water. For cleaning hard-to-remove films, use isopropyl alcohol very sparingly so that the electronic surface is not damaged.

- Poorly buffered solutions with low specific conductance (less than 200 microsiemens per centimeter) may cause fluctuations in the pH readings. Equilibrate electrode by immersing in several aliquots of sample before taking pH.

Dissolved Oxygen

- Dissolved gases (e.g., hydrogen sulfide, halogens, sulfur dioxide) are a factor with the performance of DO probes. The effect is less pronounced on optical DO meters. Meter type and potential interferences should be considered based on potential sulfate/sulfide or nitrate/nitrite reducing environments.

- Exposure of the sample to the atmosphere will cause elevated DO measurements.

Turbidity Meter

- If the weather is warm and humidity is high, condensation may collect on the cuvet. To avoid this, allow the sample to warm and dry the outside of the cuvet before making the measurement. One method used to accomplish this is to place the cuvet against one's body (armpits work well).

Temperature

- Sample temperature will change rapidly when there are significant differences between the sample and ambient air.

5.4 Apparatus and Materials

Field personnel shall consult the site work plan and SAP to review the equipment requirements for the sampling procedures to be followed during the sampling effort. The specific apparatus and materials required will depend on the water quality parameters being monitored. Table 1 shows the common equipment used in water quality parameter testing.

Table 1
Water Quality Parameter Testing — Common Equipment

Water Quality Parameter Instrument	Calibration Standards Required	Other Equipment
pH Meter	Yes - 2 or 3 Point Standards depending on groundwater range. Calibration must cover the range to be measured. If samples are above or below typical buffer standards (4, 7 and 10), special order buffers that fall outside groundwater pH range.	Container or flow thru cell for holding sample
Specific Conductance	Yes	Container or flow thru cell for holding sample
ORP Meter	Yes	Container or flow thru cell for holding sample
Turbidity Meter	Yes	Container or flow thru cell for holding sample
DO	No	Container or flow thru cell for holding sample
Thermometer	No	Container or flow thru cell for holding sample
Flow Rate	No	Calibrated Container

Notes:
ORP = Oxidation-Reduction Potential
DO = Dissolved Oxygen

5.5 Instrument or Method Calibration

Most monitoring instruments require calibration before use, and this calibration must be conducted in the field under the ambient climatic conditions that will be present during field sampling. Calibration of monitoring instruments shall be performed in accordance with the manufacturer's specifications and recorded in the provided form in Attachment 1. Site-specific instrument calibration requirements should be specified in the SAP. The following minimum calibration requirements apply to the various types of meters used to gather water quality measurements.

Initial Calibration (IC): Before use, the instrument or meter electronics are adjusted (manually or automatically) to a theoretical value (e.g., DO saturation) or a known value of a calibration standard. An IC is performed in preparation for the first use of an instrument or if a calibration verification does not meet acceptance criteria.

Initial Calibration Verification (ICV): The instrument or meter calibration is checked or verified directly following IC by measuring a calibration standard of known value as if it were a sample and comparing the measured result to the calibration acceptance criteria for the instrument/parameter. If an ICV fails to meet acceptance criteria, immediately recalibrate the instrument using the applicable initial calibration procedure or remove it from service.

Continuing Calibration Verification (CCV): After use, the instrument or meter calibration is checked or verified by measuring a calibration standard of known value as if it were a sample and comparing the measured result to the calibration acceptance criteria for the instrument/parameter.

5.5.1 Calibration Checks

Calibration checks are conducted by measuring a known standard. They must be completed after calibration and should be performed at least one other time (i.e., after lunch) and anytime suspect measurements are encountered. Table 2 provides general acceptance ranges to be used during calibration checks. If a meter is found to be outside of the acceptance range, the meter **must** be recalibrated. If the meter remains out of range, the project manager and/or the supplier of the meter should be contacted to determine alternative measures.

Table 2
Calibration Check Acceptance Limits

Parameter	Acceptance Criteria
Dissolved Oxygen	±0.3 mg/L of the theoretical oxygen solubility
Oxidation-Reduction Potential	±10 mv from the theoretical standard value at that temperature
pH	±0.2 Standard pH Units
Specific Conductance	±5% of the standard
Turbidity	0.1 to 10 NTU: ±10% of the standard 11 to 40 NTU: ±8% of the standard 41 to 100 NTU: ±6.5% of the standard

Notes:
mg/L = milligrams per liter
mv = millivolts
NTU = nephelometric turbidity units

5.5.2 Possible and Suspected Ranges

The concentration for each parameter range should be known so that concentrations outside of the range can be noted. Table 3 presents the maximum range of the parameter in groundwater. The table also presents the suspected range. Measurements outside of the maximum/minimum range should be considered in error and the measurement method should be checked. Concentrations outside the normal range should be treated as suspect but may be the result of contaminant impact. For example, a pH of 2.0 would be out of the normally suspected range for groundwater but not at a site impacted with an acid.

Table 3
Minimum and Maximum Result Ranges

Parameter	Units	Possible Min	Possible Max	Normal Min	Normal Max	Notes
Dissolved Oxygen	mg/L	0.0	14.6 (0°C) 10.1 (15°C) 8.3 (2°C)	0.0	5	The colder the sample, the higher the DO reading. DO greater than 1 mg/L, ORP positive should not have sulfur odor, sulfide, ferrous iron and/or gray color. DO less than 1 mg/L, ORP negative, may have sulfur odor, sulfide, ferrous iron and/or gray color.
pH	SU	0	14	5	9	pH values exceeding 10 could indicate grout contamination
ORP	mv					DO greater than 1 mg/L, ORP positive should not have sulfur odor, sulfide, ferrous iron and/or gray color. DO less than 1 mg/L, ORP negative, may have sulfur odor, sulfide, ferrous iron and/or gray color.
Specific Conductance	µS/cm			varies	varies	
Temperature	°C	0	100	5	30	
Turbidity	NTU	0	Greater than 1,000	0	Greater than 1,000	50 NTU or greater suggests cloudiness.

Notes:
mg/L = milligrams per liter
°C = degrees Celsius
DO = dissolved oxygen
SU = standard units
ORP = oxidation reduction potential
mv = millivolts
mS/cm = micro Siemens per cm
NTU = nephelometric turbidity units

5.5.3 Field Instruments and Calibration Criteria

The calibration acceptance criteria for each instrument are summarized in Table 4 along with special considerations related to each field instrument.

Table 4
Calibration Check Acceptance Limits

Parameter	Acceptance Criteria
Dissolved Oxygen	±0.3 mg/L of the theoretical oxygen solubility.
Oxidation-Reduction Potential	±10 mv from the theoretical standard value at that temperature.
pH	±0.2 Standard pH Units
Specific Conductance	±5% of the standard
Turbidity	0.1 to 10 NTU: ±10% of the standard 11 to 40 NTU: ±8% of the standard 41 to 100 NTU: ±6.5% of the standard

Notes:
mg/L = milligrams per liter
mv = millivolts
NTU = nephelometric turbidity units

pH Meters

- For the most accurate of pH measurements, pH meters should receive a three-point calibration. However, if a two-point calibration will bracket the groundwater pH of the site, a two-point calibration is acceptable. Three-point calibrations typically include calibrating to solutions of pH 7.00, 4.00, and 10.00. If groundwater pH is outside the calibration range of the solution standards, special buffers must be ordered to bracket the pH. Some meters will report the slope of the calibration and this may be used in checking the meter calibration (refer to the meter's manual). When performing an ICV, the result must be within +/- 0.2 pH units of the stated buffer value.

- pH meters should be calibrated across the range of values to be measured. The maximum and minimum calibration solutions shall be outside the range of anticipated values. For example, if the expected range is between 7.50 and 9.00, the 7.00 and the 10.00 standard should be used for calibration. Perform the IC using at least two buffers, and always use the pH 7.00 buffer first. A reading that is above the maximum (or below the minimum) calibration standard is an estimate only and is not valid. This condition requires obtaining a new standard that is above (or below) the reported value, depending on the measurement.

- A percent slope of less than 90 percent indicates a bad electrode that must be changed or repaired. If percent slope cannot be determined, or the manufacturer's optimum specifications are different, follow the manufacturer's recommendation for maintaining optimum meter performance.

Specific Conductivity Meters

- For IC, when the sample measurements are expected to be 100 microsiemens per centimeter (µS/cm) or greater, use two standard potassium chloride (KCl) solutions that bracket the range of expected sample conductivities. Calibrate the instrument with the first standard. Verify the calibration of the instrument with the second standard, bracketing the range of expected sample values.

- If the instrument can be calibrated with more than one standard, choose additional calibration standards within the range of expected sample values.

- When the sample measurements are expected to be less than 100 µS/cm, a lower bracket is not required, but one standard (KCl) solution that is within the range of expected measurements must be used for the IC and the ICV.

- Accept the calibration if the meter reads within +/- 5 percent of the value of any calibration standard used to verify the calibration.

- Most field instruments read conductivity directly. Record all readings and calculations in the calibration records.

- For CCV, check the meter with at least one KCl standard with a specific conductance in the range of conductivity measured in environmental samples. The reading for the calibration verification must also be within +/- 5 percent of the standard value.

- If new environmental samples are encountered outside the range of the IC, verify the instrument calibration with two standards bracketing the range of sample values. If these calibration verifications fail, recalibrate the instrument.

Dissolved Oxygen Meters

- Before calibrating, check the probe membrane for bubbles, tears, or wrinkles. These conditions require replacement of the membrane in accordance with the manufacturer's directions.

- If the meter provides readings that are off-scale, will not calibrate, or drift, check the leads, contacts, etc., for corrosion and/or short circuits. These conditions require replacement maintenance in accordance with the manufacturer's directions.
- Most DO meters must be calibrated based on an environment of 100 percent humidity and a known elevation and barometric pressure (BP).

- For 100 percent humidity, place the probe in the calibration container with a moist towel and allow the probe to remain, undisturbed, for 10 to 20 minutes.

- The IC is an air calibration at 100% saturation. Before use, verify the meter calibration in water-saturated air to make sure it is properly calibrated and operating correctly. Make a similar verification at the end of the day or sampling event. Follow the manufacturer's instructions for your specific instrument. Allow an appropriate warm up period before IC. Wet the inside of the calibration chamber with water, pour out the excess water (leave a few drops), wipe any droplets off the membrane/sensor and insert the sensor into the chamber (this ensures 100 percent humidity). Allow adequate time for the DO sensor and the air inside the calibration chamber to equilibrate. Once the probe/calibration chamber is stable at ambient temperature, check the air temperature and determine, from the DO versus temperature table (see Attachment 2) what DO should measure. The acceptance criterion for DO ICV is +/- 0.3 mg/L.

- Use the same procedure as above for CCV.

ORP Meters

- Verify electrode response before use in the field.

- Equilibrate the standard solution to the temperature of the sample. The standard solution is based on a 25°C temperature; however, the calibration solution standard's value will require adjustment based on the temperature.

- Immerse the electrodes and gently stir the standard solution in a beaker (or flow cell). Turn the meter on, placing the function switch in the millivolt (mv) mode.

- Let the electrode equilibrate and record the reading to the nearest millivolt. The reading must be within ±10 mv from the theoretical redox standard value at that temperature. If not, determine the problem and correct it before proceeding. Switch to temperature display and read the value.

- Record the mv reading and temperature in the field notebook or in form. Rinse the electrode with distilled water and proceed with the sample measurement, unless using a flow cell. If a flow cell is used, rinse between sample locations.

Turbidity Meters

- Perform an initial calibration using at least two primary standards.

- If the instrument cannot be calibrated with two standards, calibrate the instrument with one standard and verify with a second standard.

- Perform an ICV by reading at least one primary standard as a sample. The acceptance criterion for the ICV depends on the range of turbidity of the standard value:

    1. Standard Value = 0.1 to 10 NTU: the response must be within 10 percent of the standard;

    2. Standard Value = 11 to 40 NTU: the response must be within 8 percent of the standard;

    3. Standard Value = 41 to 100 NTU: the response must be within 6.5 percent of the standard; and

    4. Standard Value greater than 100 NTU: the response must be within 5 percent of the standard.

- Determining the Values of Secondary Standards: Use only those certified by the manufacturer for a specific instrument. Secondary standards may be used for CCVs.

To initially determine the value of a secondary standard, assign the value that is determined immediately after an ICV or verification with primary standards. This is done by reading the secondary standard as a sample. This result must be within the manufacturer's stated tolerance range and +/- 10 percent of the assigned standard value. If the +/- 10 percent criterion is not met, assign this reading as the value of the standard. If the reading is outside the manufacturer's stated tolerance range, discard the secondary standard.

- CCV: Perform a CCV using at least one primary or secondary standard. The calibration acceptance criteria are the same as those for an ICV.

5.6 Direct Measurements

Direct measurements with meters are the most common methods and can be accomplished by placing a sample in a container with the probe or by allowing the water to flow past the probe in a flow cell. The use of a flow-through cell improves measurement quality by allowing the constant flow of water over the probes and reduces interaction of the sample with the atmosphere. Sample cups should be avoided. The quantity of samples, timing, and methodology should be described in the project SAP.

Following calibration of required probes, connect the bottom flow-cell port to the discharge line of the pump. Connect the top port to a discharge line directed to a bucket to collect the purge water. Allow the flow cell to completely fill. As the water flows over the probe, record the measurements. Continue to record the measurements at regular intervals, as specified in the SAP.

When the ambient air temperatures are much higher or lower than the temperature of the water sample, it is best to keep the length of tubing between the wellhead and the flow cell as short as possible to prevent heating or cooling of the water. Tubing and flow-through cell should not be exposed to direct sunlight, particularly in the summer, if at all possible, to avoid heating of water samples.

5.7 Data Acquisitions, Calculations, and Data Reduction

5.7.1 Specific Conductivity Correction Factions

If the meter does not automatically correct for temperature (i.e., read Specific Conductivity) record Conductivity and adjust for temperature upon returning to the office. The following equation can be used to convert Conductivity to Specific Conductivity.

$$K = \frac{(Km)(C))}{1 + 0.0191(\mathrm{T} - 25)}$$

Where:

K = Conductivity in μmhos/cm at 25°C

Km = Measured conductivity in μmhos/cm at T degrees Celsius

C = Cell constant

T = Measured temperature of the sample in degrees Celsius;

If the cell constant is 1, the formula for determining conductivity becomes:

$$K = \frac{(Km)}{1 + 0.0191(\mathrm{T} - 25)}$$

5.7.2 Percentage Difference Calculation

For evaluating slope of readings from either a flow cell or a sample cup.

$$\%Difference = \frac{(Highest\ Value - Lowest\ Value)}{(Highest\ Value)}\ x\ 100$$

5.7.3 Convert mm mercury (mmHG) to inches mercury (inHG)

$$mmHG = inHG\ x\ 25.4$$

5.7.4 True Barometric Pressure

For converting BP obtained from a public domain source that is expressed in BP at sea level to BP at the subject site.

$$TrueBP = (BP) - \frac{(2.5\ x\ [Local\ Altitude])}{100}$$

Where: BP is in mmHG and Local Altitude is in feet

Example: BP at site A is 30.49 inHg and elevation is 544 feet, calculate TrueBP

Convert inHG to mmgHG:

mmHg = 30.49 inHg x 25.4 = 774.4 mmHg

Calculate True BP:

TrueBP = (774.4 mmHg) – [2.5 * (544 /100)] = 774.4-13.6 = 760.8 mmHg

6.0 RECORDS

Data will be recorded promptly, legibly, and in indelible ink on the appropriate logbooks and forms. At the completion of a field effort, all logbooks, field data forms, and calibration logs shall be scanned and made electronically available to the project team. The original field forms, calibrations logs, and log book will be maintained in the project file.

7.0 HEALTH AND SAFETY

Detailed Health and Safety requirements can be found in the site specific Health and Safety Plan. Ensure that a Safe Work Assessment and Permit form is filled out daily prior to any work in the field and reviewed with all project personnel in a daily safety brief.

Safety glasses with side shields or goggles and disposable gloves shall be worn during calibration activities.

8.0 REFERENCES

None

9.0 ATTACHMENTS

Attachment 1: Example Field Instrument Calibration Form
Attachment 2: Solubility of Oxygen at Given Temperatures
Attachment 3: Example Field Data Form

Author	Reviewer	Revisions (Technical or Editorial)
Resolution Consultants		Rev 0
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 – Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

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Attachment 1

Example Field Instrument Calibration Form

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Field Instrument Calibration Form

Calibrated by: ______________________

Date: ______________________

Equipment (Make/Model/Serial#): ______________________

Equipment (Make/Model/Serial#): ______________________

pH (su) — Standard: ± 0.2 standard units

Initial Calibration / Initial Calibration Verification

	Hach SL	Reading	Pine SL	Reading
pH7				
pH4				

Continuing Calibration Verification

	Hach SL	Reading	Deviation	Acceptable Variance (Y/N)
pH7				
pH4				

DO (mg/L) — Standard: ± 0.3 mg/L of theoretical*

IC (Temp:) / ICV (Temp:)

Saturation (%)	Reading (%)	Theoretical (mg/L)	Reading (mg/L)
100			

CCV (Temp:)

Saturation (%)	Reading (%)	Deviation	Acceptable Variance (Y/N)
100			

Theoretical (mg/L)	Reading (mg/L)	Deviation	Acceptable Variance (Y/N)

ORP (mV) — Standard: NA

IC (Zobell SL:) / ICV (Pine SL:)

TCS (Std/Temp)	Reading	TCS (Std/Temp)	Reading

CCV (Zobell SL:)

TCS (Std/Temp)	Reading	Deviation	Acceptable Variance (Y/N)

Turbidity (ntu) — Standard: ±10% of Standard

Initial Calibration

Standard	Reading

Continuing Calibration Verification

Standard	Reading	Deviation	Acceptable Variance (Y/N)

Conductivity (ms^c/cm) — Standard: ± 5% of standard value

IC (YSI SL:) / ICV (Pine SL:)

Standard	Reading	Standard	Reading

CCV (YSI SL:)

Standard	Reading	Deviation	Acceptable Variance (Y/N)

Comments:

Notes:

SL	solution lot	su	standard units
TCS	temperature corrected standard	mV	millivolts
Std	standard	%	percent
Temp	temperature	mg/L	milligrams per liter
ntu	Nephelometric Turbidity Units	°C	degrees Celsius
ms^c/cm	millisiemens per centimeter (temperature corrected)	*	Theoretical value

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Attachment 2

Solubility of Oxygen at Given Temperatures

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Field Measurement of Dissolved Oxygen

Solubility of Oxygen in Water at Atmospheric Pressure			
Temperature	**Oxygen Solubility**	**Temperature**	**Oxygen Solubility**
°C	**mg/L**	**°C**	**mg/L**
0.0	14.621	26.0	8.113
1.0	14.216	27.0	7.968
2.0	13.829	28.0	7.827
3.0	13.460	29.0	7.691
4.0	13.107	30.0	7.559
5.0	12.770	31.0	7.430
6.0	12.447	32.0	7.305
7.0	12.139	33.0	7.183
8.0	11.843	34.0	7.065
9.0	11.559	35.0	6.950
10.0	11.288	36.0	6.837
11.0	11.027	37.0	6.727
12.0	10.777	38.0	6.620
13.0	10.537	39.0	6.515
14.0	10.306	40.0	6.412
15.0	10.084	41.0	6.312
16.0	9.870	42.0	6.213
17.0	9.665	43.0	6.116
18.0	9.467	44.0	6.021
19.0	9.276	45.0	5.927
20.0	9.092	46.0	5.835
21.0	8.915	47.0	5.744
22.0	8.743	48.0	5.654
23.0	8.578	49.0	5.565
24.0	8.418	50.0	5.477
25.0	8.263		

Notes:

The table provides three decimals to aid interpolation

Under equilibrium conditions, the partial pressure of oxygen in air-saturated water is equal to that of the oxygen in water saturated

°C = degrees Celsius

mg/L = milligrams per liter

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Attachment 3

Example Field Data Form

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WELL DEVELOPMENT & GROUNDWATER SAMPLING FORM

DATE:	JOB NUMBER:	EQUIPMENT (Make/Model #/Serial #):
PROJECT:	EVENT:	/ /
WELL ID:	LOCATION:	/ /
WEATHER CONDITIONS:	AMBIENT TEMP:	/ /
REVIEWED BY:	PERSONNEL:	/ /

WELL DIA:	**WELL DEVELOPMENT**	
TOTAL DEPTH from TOC (ft.):	START:	FINISH:
DEPTH TO WATER from TOC (ft.):	VOLUME PURGED (gal):	
LENGTH OF WATER COL. (ft.):	**GROUNDWATER SAMPLING**	
1 VOLUME OF WATER (gal):	START:	FINISH:
3 VOLUMES OF WATER (gal):	VOLUME PURGED (gal):	
	ANALYSIS:	

WELL DEVELOPMENT PARAMETERS		GW SAMPLING PARAMETERS	
Temperature:	± 1.0° C	Temperature:	± 0.2° C
pH:	± 0.5 standard units	pH:	± 0.2 standard units
Specific Conductance:	± 10% of the past measurement	Specific Conductance:	± 5% of the past measurement
Turbidity:	relatively stable	DO:	≤ 20% saturation
		ORP:	± 10 millivolts
		Turbidity:	≤ 10 NTU

IN-SITU TESTING

Circle one: DEVELOPMENT SAMPLING ☐ Bailer ☐ Pump Description:

Time (hh:mm):												
pH (units):												
Conductivity (mS/cm):												
Turbidity (NTU):												
DO (mg/L): YSI 556												
DO (mg/L): YSI 550												
Temperature (C°):												
ORP (mV):												
Volume Purged (gal):												
Depth to Water (ft):												
							Well Goes Dry While Purging ☐					

SAMPLE DATA

☐ Bailer ☐ Pump Description:

Sample ID	Date (m/d/y)	Time (hh:mm)	Bottles (total to lab)	Filtered (0.45 µm)	Remarks
Purging/Sampling Device Decon Process:					

COMMENTS:

Purge water placed in drum#______________

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In-Situ Hydraulic Conductivity Testing via Rising or Falling Head Slug Testing

Procedure 3-35

1.0 Purpose and Scope

1.1 This Standard Operating Procedure (SOP) describes the methods used to obtain in-situ hydraulic conductivity test data via rising or falling head slug testing (also commonly referred to as variable head testing). Slug tests are performed to assess the hydraulic conductivity of the soil or rock surrounding the tested monitoring well. Hydraulic conductivity is a measure of the ease of flow of water through a specific porous medium or fracture when subjected to a hydraulic gradient.

Hydraulic conductivity values are used:

- To estimate rates of groundwater flow;
- To estimate responses of aquifers to applied stresses, such as pumping;
- To estimate the rate of movement of various chemicals in subsurface zones; and
- To construct and calibrate groundwater flow models.

Specific information regarding the slug testing scope of work can be found in the associated Sampling and Analysis Plan (SAP).

1.2 The purpose of this SOP is to provide a description of a specific method or procedure to obtain in-situ hydraulic conductivity test results. In-situ hydraulic conductivity tests can be conducted in open boreholes or in monitoring wells and they can be performed using constant head or variable head test (i.e., slug test) methods. During a constant head test, water levels are maintained at a pre-determined level (relative to static conditions) and the groundwater flow is monitored. During a variable head test (slug test), as it applies to this SOP, a sudden (instantaneous) rising or falling of the static water level in a borehole or monitoring well is produced by injecting or withdrawing a volume or slug of water or solid cylinder. Water levels are monitored and recorded until the water level has returned to static conditions or sufficient data is collected to perform the hydraulic conductivity calculations. The change in water levels can be produced by displacing a known volume of water using a slug. The response of water levels to the test can be monitored using a water level tape or with computerized data loggers. Data loggers are preferred because they can collect many measurements in a short period of time, which is important for evaluating the early-time response of the aquifer to the slug. For the purpose of this SOP and the field program outlined in the SAP, the method to perform a variable head (slug test) in a monitoring well using a computerized data logger will be outlined.

1.3 This procedure is the Program-approved professional guidance for work performed by AECOM.

1.4 As guidance for specific activities, this procedure does not obviate the need for professional judgment or state-specific requirements. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program requirements for technical planning and review.

1.5 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Program Quality Manager. Deviations to this SOP will be documented in the field records.

2.0 Safety

2.1 Depending upon the site-specific contaminants, various protective programs must be implemented prior to performing any hydraulic conductivity tests at the first location. All **field testing personnel** responsible for performing any hydraulic conductivity test activities must review the project-specific health and safety plan (HASP) paying particular attention to the control measures planned for the tasks. Conduct preliminary area monitoring to determine the potential hazard to field sampling personnel. If significant contamination is observed, minimize contact with potential contaminants in both the vapor and liquid phase through the use of respirators and disposable clothing.

2.2 Observe standard health and safety practices according to the project-specific HASP. Suggested minimum protection during hydraulic conductivity testing activities includes inner disposable vinyl gloves, outer chemical-protective nitrile gloves, rubberized steel-toed boots, and an American National Standards Institute-standard hard hat. Half-face respirators and cartridges and Tyvek® suits may be necessary depending on the contaminant concentrations, and shall always be available on site.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the **Site Safety Officer (SSO)** or designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the HASP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

2.4 Hydraulic conductivity testing may involve chemical hazards associated with exposure to groundwater and the testing equipment that comes in contact with the groundwater. When conducting hydraulic conductivity tests, adequate health and safety measures must be taken to protect field personnel. These measures are addressed in the project HASP. All work will be conducted in accordance with the HASP.

3.0 Terms and Definitions

None.

4.0 Interferences

Many potential interferences can occur during the performance and analysis of slug tests. For this reason, appropriately trained personnel shall perform the tests in the field and conduct the data analysis. Data and analysis will be reviewed by a professional geologist, or other qualified professional in accordance with state-specific requirements.

Well construction is a common cause of physical slug test interference. For wells screened across the water table where an unsaturated zone of soil is exposed, falling head slug tests (i.e., the instantaneous rise in static groundwater levels) may not provide accurate measures of hydraulic conductivity. While falling head slug tests may be conducted in such wells, the results will not be used quantitatively unless the data analysis indicates that an accurate measurement of hydraulic conductivity has been obtained.

5.0 Training and Qualifications

5.1 Qualifications and Training

5.1.1 The individual(s) executing these procedures must have read, and be familiar with, the requirements of this SOP.

5.2 Responsibilities

5.2.1 The **Contract Task Order (CTO) Manager** is responsible for ensuring that the hydraulic conductivity testing activities comply with this procedure. The CTO Manager or designee shall review all hydraulic conductivity forms prior to use. The CTO Manager is responsible for ensuring that all field personnel involved in hydraulic conductivity testing and data analysis shall have the appropriate education, experience, and training to perform their assigned tasks.

5.2.2 The **Program Quality Manager** is responsible for ensuring overall compliance with this procedure.

5.2.3 The **Field Manager** is responsible for ensuring that all field personnel involved in hydraulic conductivity testing follow these procedures.

5.2.4 **Field testing personnel** are responsible for the implementation of this procedure. Minimum qualifications for field testing personnel require that one individual on the field team shall should be familiar with the theory and practice of slug testing and analysis, as well as with all necessary equipment and field software. Geologists, hydrogeologist, other personnel with geologic or hydrogeologic experience, or other qualifications based on state-specific requirements, should supervise hydraulic conductivity testing.

5.2.5 **Data analysis personnel** are responsible for the review of data associated with this procedure. Minimum qualifications for data analysis personnel require the individual be familiar with the theory and practice of slug testing and analysis, as well as with all necessary software. Geologists, hydrogeologist, other personnel with geologic or hydrogeologic experience, or other qualifications based on state-specific requirements, should review the hydraulic conductivity test results and data interpretation.

5.2.6 The **field testing personnel and/or task manager** is responsible for directly supervising the hydraulic conductivity field testing to ensure that the testing is conducted in accordance with this procedure and state-specific requirements, should they apply, and for recording all pertinent data collected during testing. If deviations from the procedure are required because of anomalous field conditions, they must first be approved by the Program Quality Manager and then documented in the field logbook and associated report or equivalent document.

6.0 Equipment and Supplies

General field supplies to perform the slug testing include the following items:

- Boring logs (if available)
- Well construction diagrams (if available)
- Well development logs (if available)
- Water level meter
- Slug (bailer or solid cylinder)
- Nylon string
- Water level indicator
- Pressure transducer(s)
- Data logger(s)
- Computer with appropriate software
- Plastic sheeting
- Equipment decontamination materials (as required by Resolution Consultants SOP No. 3-06 – Equipment Decontamination)
- Health and safety supplies (as required by the HASP)
- Approved plans (e.g., HASP, SAP, QAPP)
- Field project logbook/pen

7.0 Procedure

7.1 General Preparation

The boreholes or monitoring wells to be tested should have been previously developed and had sufficient time to equilibrate before the testing process proceeds (minimum of one week). Well construction diagrams are necessary to determine the depth of the monitoring well and the screened interval.

All equipment that will come into contact with the groundwater will be decontaminated and tested prior to the start of field activities. Any sharp edges of the well casing will be covered with duct tape to protect transducer cables.

An initial round of static water level measurements will be collected prior to initiating the slug test. Wells will be gauged (and subsequently tested) from least contaminated to most contaminated, if known/possible. The static water level in each well will be measured and recorded in the field logbook or field form.

The slug diameter and length to be used in the monitoring well will be determined based on the diameter of the well and the length of the water column. In general, the larger the volume of the slug, the greater the displacement of head and the better the definition of response in the resulting data. However, the slug must be short enough to be completely submerged beneath the static water level, and there must be room beneath the bottom of the slug for the transducer. The transducer and cable should be installed in the well at least two feet from the bottom of the well and be held in place using duct tape to keep the transducer at a constant depth. Therefore, a minimum of seven feet of water within the monitoring well is typically necessary for conducting the test. The transducer will then be connected to the data-logging device and the initial water level recorded. The slug length and diameter will be recorded in the field logbook or field form for use in the data analysis.

Either a pressure transducer connected to a data logger or a programmable down-hole data logger will be used to record the changes in water level during the test. The transducer must be set at least one slug length below the water surface so the slug does not disturb the transducer; several feet deeper is preferable, if possible. After the water level has equilibrated to the static level, the data logger will be programmed according to manufacture's instructions. The data logger will be programmed to record water levels at logarithmically increasing intervals, because early-response data is important for the data analysis.

A measured length of nylon string will be tied to the slug. The line will be of a length that will allow the top of the slug to be submerged beneath the static water level without touching the transducer.

7.2 Falling Head Test

The slug will be lowered part way into the well so that the bottom of the slug is just above the water surface. The data logger will be started and the slug will be simultaneously lowered into the water, so that the top of the slug is below the static water level. Care will be taken to lower the slug fast enough to produce as close to an instantaneous rise in the water level as possible, but not so fast as to produce a wave when the slug enters the water.

When the water level returns to the static level, the falling head test is complete and the rising head test can be started. The data should be saved and a new test set up on the data logger.

If the hydraulic conductivity is low, it may take hours (or more) for the water level to return to static conditions. In this situation, the Field Manager should determine a maximum duration for each test (typically 30 minutes).

The falling head test may not be accurate for wells with screens that bracket the stabilized water table. These tests may be performed in water table wells, but the results will not be used quantitatively unless the data analysis indicates that an accurate measurement of hydraulic conductivity has been obtained.

7.3 Rising Head Test

After the data logger is reset following the falling head test, the test will be started by activating the logger and simultaneously removing the slug. The slug will be quickly removed from the water so that an instantaneous drop in the water level will occur, but it will be done smoothly enough to not disturb the transducer when removing the slug. When the water has returned to a static condition or the maximum duration of time has elapsed (typically 30 minutes), the test will be terminated.

7.4 Data Download

At the completion of the test(s), the data from the slug tests will be downloaded to a laptop computer. If feasible, this data will be plotted on a graph of time versus water level to see if it is acceptable (i.e., adequate water level displacement, sufficient number of data points, a straight-line fit to data, no extraneous fluctuations resulting from inadvertent slug movement and/or pressure waves). If the data are not acceptable, the test(s) will be repeated once water levels have stabilized.

7.5 Equipment Decontamination

All equipment that comes into contact with groundwater (e.g., slugs, transducer, and water level meter) will be decontaminated in accordance with Resolution Consultants SOP No. 3-06 - Equipment Decontamination before moving to the next location. The string should be properly discarded and disposed of.

8.0 QUALITY CONTROL AND QUALITY ASSURANCE

Quality assurance requirements typically suggest the collection of both the rising head and falling head data. Rising head data are preferred for wells screened across the water table because the hydraulic conductivity of the saturated portion of the aquifer is reflected, whereas falling head data may reflect the hydraulic conductivity of the unsaturated zone and capillary fringe.

For quality control purposes, the transducer data logging will be started immediately prior to lowering or removing the slug. The transducer should be activated approximately 1 second prior to ensure that the transducer is recording water level changes and that the transducer is taking readings at frequent intervals during the early part of the well response curve. Care must be taken when lowering or removing the slug to avoid splashing or generating wave effects that would obscure the early-time data.

Data from the rising and falling head tests should be inspected in graphical format to ensure that adequate water level displacement was achieved for both tests, that the data logger recorded all data from the test, and that no fluctuations exist in the data due to violent slug movement.

Both rising and falling head tests may be conducted to help draw attention to any inconsistencies in the data. If the rising and falling head results are not comparable, the data should be investigated to assess which test may more accurately reflect the hydraulic properties of the aquifer, or whether the pressure transducer recorded accurate data. Knowledge of the boring logs is essential to assessing whether the measured response is consistent with the expected response. If a consistent response is not obtained, the tests should be run again.

If applicable per state-specific requirements, the work performed under this SOP will be conducted under the direction of and reviewed by the required trained, certified or licensed personnel.

9.0 Data and Records Management

9.1 Records Management

Records will be maintained in accordance with SOP 3-03, Recordkeeping, Sample Labelling, and Chain-of-Custody. A field logbook will be maintained to ensure that adequate documentation is made of hydraulic conductivity testing activities. Information, such as background information such as well diameter, depth, and screened interval, will be documented from existing monitoring well construction logs in the field logbook or other site-specific test log, if applicable. These data will be used in the calculation of hydraulic conductivity, based on the test data. The slug length, slug diameter, water level, well identification number, test type (rising or falling), file name, and time will also be recorded. The actual data of time versus water level will be recorded on the data logger and transferred to a laptop computer. In addition, any problems or unusual conditions that may have occurred during the testing process will also be recorded.

Software files associated with the hydraulic conductivity testing activities will be saved in the associated project files upon completion of the field activities.

The records generated in this procedure will become part of the permanent record supporting the associated fieldwork. All documentation will be retained in the project files following project completion.

The field logbook is kept as a general log of activities and should not be used in place of any site-specific test log, if applicable.

Unanticipated changes to the procedures or materials described in this SOP (deviations) will be appropriately documented in the project records.

Records associated with the activities described in this SOP will be maintained according to the document management policy for the project.

9.2 Data Analysis

Several methods are available for analyzing data obtained from in-situ hydraulic conductivity tests. Most methods incorporate graphical techniques, such as semi-log and log-log plots, to evaluate the data and select values for the calculations.

Inherent in the analytical methods are several simplifying assumptions concerning the aquifer properties and test methods. When selecting a particular analytical method, it is important to consider the basic assumptions that underlie the mathematical expressions. In many cases, it may be advisable to evaluate the data using several methods and examine the range of hydraulic conductivity values that are obtained. For this project, it is expected that the data will be analyzed using appropriate methodologies (e.g., Bouwer and Rice, 1976; Kansas Geological Survey methods [Hyder, et al., 1994]; Cooper, et al, 1967).

10.0 Attachments and References

10.1 Attachments

SOP 3-03, *Recordkeeping, Sample Labelling, and Chain-of-Custody*

SOP 3-06, *Equipment Decontamination*

10.2 References

Bouwer, H and RC Rice. 1976. A slug test for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells. Water Resources Research, Vol. 12, pp. 423-428.

Cooper, H Jr., D Bredehoeft, and S Papadopulos. 1967. Response of a Finite-Diameter Well to an Instantaneous Charge of Water. Water Resources Research, Vol. 3, No. 1.

Hyder, Z, JJ Butler, Jr, CD McElwee, and W Liu. 1994. Slug tests in partially penetrating wells. Water Resources Research, Vol. 30, No. 11: 2945-2957.

USEPA SOP#2046, Slug Tests, October 3, 1994.

Author	Reviewer	Revisions (Technical or Editorial)
Naomi Ouellette, Environmental Scientist	Lauren Roberts, Environmental Scientist	Rev 0 – Initial Issue (November 2012)
Amanda Martin Environmental Scientist	Mark Kauffman Program Manager	Rev 1 - Editorial change only; converted to AECOM SOP for use on USACE HTRW projects (April 2017)

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Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes[1]

This standard is issued under the fixed designation D1587/D1587M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This practice covers a procedure for using a thin-walled metal tube to recover intact soil samples suitable for laboratory tests of engineering properties, such as strength, compressibility, permeability, and density. This practice provides guidance on proper sampling equipment, procedures, and sample quality evaluation that are used to obtain intact samples suitable for laboratory testing.

1.2 This practice is limited to fine-grained soils that can be penetrated by the thin-walled tube. This sampling method is not recommended for sampling soils containing coarse sand, gravel, or larger size soil particles, cemented, or very hard soils. Other soil samplers may be used for sampling these soil types. Such samplers include driven split barrel samplers and soil coring devices (Test Methods D1586, D3550, and Practice D6151). For information on appropriate use of other soil samplers refer to Practice D6169.

1.3 This practice is often used in conjunction with rotary drilling (Practice D1452 and Guides D5783 and D6286) or hollow-stem augers (Practice D6151). Subsurface geotechnical explorations should be reported in accordance with Practice D5434. This practice discusses some aspects of sample preservation after the sampling event. For more information on preservation and transportation process of soil samples, consult Practice D4220.

1.4 This practice may not address special considerations for environmental or marine sampling; consult Practices D6169 and D3213 for information on sampling for environmental and marine explorations.

1.5 Thin-walled tubes meeting requirements of 6.3 can also be used in piston samplers, or inner liners of double tube push or rotary-type soil core samplers (Pitcher barrel, Practice D6169). Piston samplers in Practice D6519 use thin-walled tubes.

1.6 All observed and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026, unless superseded by this standard.

1.7 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

1.8 The values stated in either inch-pound units or SI units presented in brackets are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A513/A513M Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
A519 Specification for Seamless Carbon and Alloy Steel Mechanical Tubing
A787 Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing
B733 Specification for Autocatalytic (Electroless) Nickel-Phosphorus Coatings on Metal

[1] This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Evaluations.

Current edition approved Nov. 15, 2015. Published December 2015. Originally approved in 1958. Last previous edition approved in 2012 as D1587 – 08 (2012)$^{\varepsilon 1}$. DOI: 10.1520/D1587_D1587M-15.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard**

D653 Terminology Relating to Soil, Rock, and Contained Fluids
D1452 Practice for Soil Exploration and Sampling by Auger Borings
D1586 Test Method for Penetration Test (SPT) and Split-Barrel Sampling of Soils
D2166 Test Method for Unconfined Compressive Strength of Cohesive Soil
D2435 Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)
D2850 Test Method for Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
D3213 Practices for Handling, Storing, and Preparing Soft Intact Marine Soil
D3550 Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils (Withdrawn 2016)[3]
D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
D4186 Test Method for One-Dimensional Consolidation Properties of Saturated Cohesive Soils Using Controlled-Strain Loading
D4220 Practices for Preserving and Transporting Soil Samples
D4452 Practice for X-Ray Radiography of Soil Samples
D4767 Test Method for Consolidated Undrained Triaxial Compression Test for Cohesive Soils
D5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock
D5783 Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
D6026 Practice for Using Significant Digits in Geotechnical Data
D6151 Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling
D6169 Guide for Selection of Soil and Rock Sampling Devices Used With Drill Rigs for Environmental Investigations
D6282 Guide for Direct Push Soil Sampling for Environmental Site Characterizations
D6286 Guide for Selection of Drilling Methods for Environmental Site Characterization
D6519 Practice for Sampling of Soil Using the Hydraulically Operated Stationary Piston Sampler

3. Terminology

3.1 *Definitions:*

3.1.1 For common definitions of terms in this standard, refer to Terminology D653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *area ratio, A_r, %, n*—the ratio of the soil displaced by the sampler tube in proportion to the area of the sample expressed as a percentage (see Fig. 1).

3.2.2 *inside clearance ratio, C_r, %, n*—the ratio of the difference in the inside diameter of the tube, D_i, minus the inside diameter of the cutting edge, D_e, to the inside diameter of the tube, D_i expressed as a percentage (see Fig. 1).

3.2.3 *ovality, n*—the cross section of the tube that deviates from a perfect circle.

3.3 *Symbols:*

3.3.1 A_r—area ratio (see 3.2.1).

3.3.2 C_r—clearance ratio (see 3.2.2).

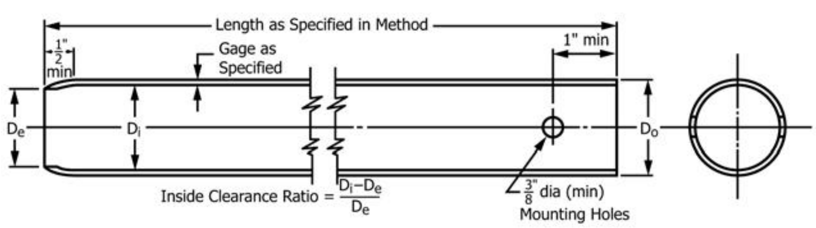
4. Summary of Practice

4.1 A relatively intact sample is obtained by pressing a thin-walled metal tube into the in-situ soil at the bottom of a boring, removing the soil-filled tube, and applying seals to the soil surfaces to prevent soil movement and moisture gain or loss.

5. Significance and Use

5.1 Thin-walled tube samples are used for obtaining intact specimens of fine-grained soils for laboratory tests to determine engineering properties of soils (strength, compressibility, permeability, and density). Fig. 2 shows the use of the sampler

[3] The last approved version of this historical standard is referenced on www.astm.org.



$$\text{Area Ratio} = (D_o^2 - D_i^2)/D_i^2$$

NOTE 1—The sampling end of the tube is manufactured by rolling the end of the tube inward and then machine cutting the sampling diameter, D_e, on the inside of the rolled end of the tube.

NOTE 2—Minimum of two mounting holes on opposite sides for D_o smaller than 4 in. [100 mm]. Minimum of four mounting holes equally spaced for D_o equal to 4 in. [100 mm] and larger.

NOTE 3—Tube held with hardened set screws or other suitable means.

FIG. 1 Thin-Walled Dimensions for Measuring Tube Clearance Ratio, C_r (approximate metric equivalents not shown)

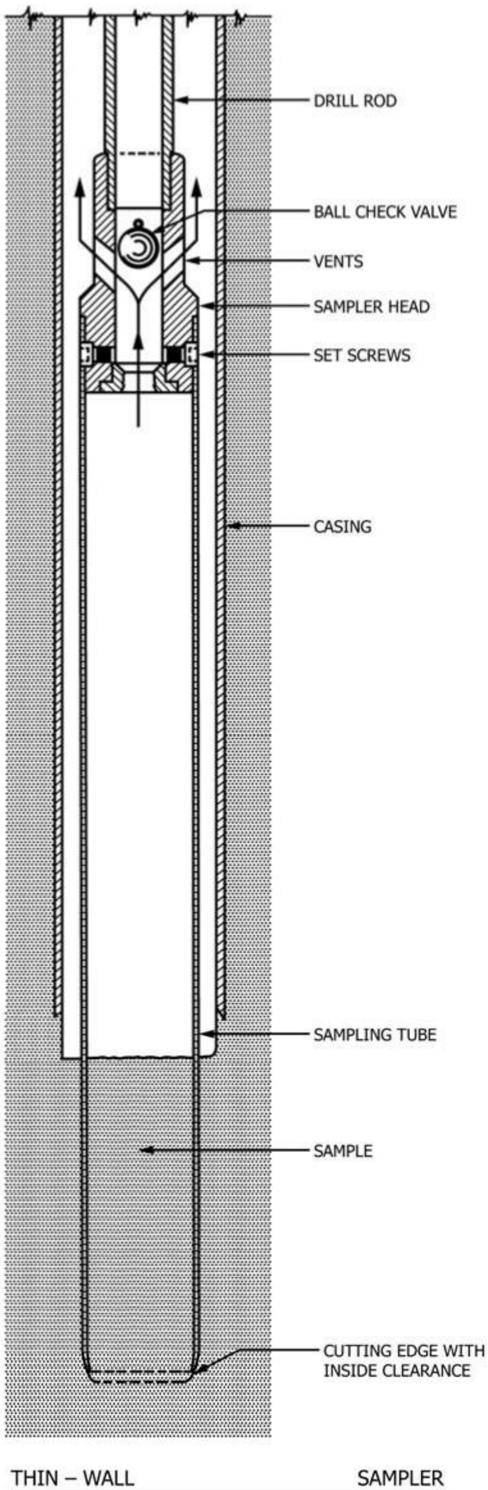


FIG. 2 Thin-Walled Tube Sampler Schematic and Operation (1)

in a drill hole. Typical sizes of thin-walled tubes are shown on Table 1. The most commonly used tube is the 3-in. [75 mm] diameter. This tube can provide intact samples for most laboratory tests; however some tests may require larger diameter tubes. Tubes with a diameter of 2 in. [50 mm] are rarely used as they often do not provide specimens of sufficient size for most laboratory testing.

TABLE 1 Suitable Thin-Walled Steel Sample Tubes[A]

Outside diameter (D_o):			
in.	2	3	5
mm	50	75	125
Wall thickness:			
Bwg	18	16	11
in.	0.049	0.065	0.120
mm	1.25	1.65	3.05
Tube length:			
in.	36	36	54
m	1.0	1.0	1.5

[A] The three diameters recommended in Table 2 are indicated for purposes of standardization, and are not intended to indicate that sampling tubes of intermediate or larger diameters are not acceptable. Lengths of tubes shown are illustrative. Proper lengths to be determined as suited to field conditions. Wall thickness may be changed (5.2.1, 6.3.2). Bwg is Birmingham Wire Gauge (Specification A513/A513M).

5.1.1 Soil samples must undergo some degree of disturbance because the process of subsurface soil sampling subjects the soil to irreversible changes in stresses during sampling, extrusion if performed, and upon removal of confining stresses. However, if this practice is used properly, soil samples suitable for laboratory testing can be procured. Soil samples inside the tubes can be readily evaluated for disturbance or other features such as presence of fissures, inclusions, layering or voids using X-ray radiography (D4452) if facilities are available. Field extrusion and inspection of the soil core can also help evaluate sample quality.

5.1.2 Experience and research has shown that larger diameter samples (5 in. [125 mm]) result in reduced disturbance and provide larger soil cores available for testing. Agencies such as the U.S Army Corps of Engineers and US Bureau of Reclamation use 5-in. [125-mm] diameter samplers on large exploration projects to acquire high quality samples (**1, 2, 3**).[4]

5.1.3 The lengths of the thin-walled tubes (tubes) typically range from 2 to 5 ft [0.5 to 1.5 m], but most are about 3 ft [1 m]. While the sample and push lengths are shorter than the tube, see 7.4.1.

5.1.4 This type of sampler is often referred to as a "Shelby Tube."

5.2 Thin-walled tubes used are of variable wall thickness (gauge), which determines the Area Ratio (A_r). The outside cutting edge of the end of the tube is machined-sharpened to a cutting angle (Fig. 1). The tubes are also usually supplied with a machine-beveled inside cutting edge which provides the Clearance Ratio (C_r). The recommended combinations of A_r, cutting angle, and C_r are given below (also see 6.3 and Appendix X1, which provides guidance on sample disturbance).

5.2.1 A_r should generally be less than 10 to 15 %. Larger A_r of up to 25 to 30 % have been used for stiffer soils to prevent buckling of the tube. Tubes of thicker gauge may be requested when re-use is anticipated (see 6.3.2).

[4] The boldface numbers in parentheses refer to a list of references at the end of this standard.

5.2.2 The cutting edge angle should range from 5 to 15 degrees. Softer formations may require sharper cutting angles of 5 to 10 degrees, however, sharp angles may be easily damaged in deeper borings. Cutting edge angles of up to 20 to 30 degrees have been used in stiffer formations in order to avoid damage to the cutting edges.

5.2.3 Optimum C_r depends on the soils to be tested. Soft clays require C_r of 0 or less than 0.5 %, while stiffer formations require larger C_r of 1 to 1.5 %.

5.2.3.1 Typically, manufacturers supply thin-walled tubes with C_r of about 0.5 to 1.0 % unless otherwise specified. For softer or harder soils C_r tubes may require special order from the supplier.

5.3 The most frequent use of thin-walled tube samples is the determination of the shear strength and compressibility of soft to medium consistency fine-grained soils for engineering purposes from laboratory testing. For determination of undrained strength, unconfined compression or unconsoliled, undrained triaxial compression tests are often used (Test Methods D2166 and D2850). Unconfined compression tests should be only used with caution or based on experience because they often provide unreliable measure of undrained strength, especially in fissured clays. Unconsolidated undrained tests are more reliable but can still suffer from disturbance problems. Advanced tests, such as consolidated, undrained triaxial compression (Test Method D4767) testing, coupled with one dimensional consolidation tests (Test Methods D2435 and D4186) are performed for better understanding the relationship between stress history and the strength and compression characteristics of the soil as described by Ladd and Degroot, 2004 (**4**).

5.3.1 Another frequent use of the sample is to determine consolidation/compression behavior of soft, fine-grained soils using One-Dimensional Consolidation Test Methods D2435 or D4186 for settlement evaluation. Consolidation test specimens are generally larger diameter than those for strength testing and larger diameter soil cores may be required. Disturbance will result in errors in accurate determination of both yield stress (5.3) and stress history in the soil. Disturbance and sample quality can be evaluated by looking at recompression strains in the One-Dimensional Consolidation test (see Andressen and Kolstad (**5**)).

5.4 Many other sampling systems use thin-walled tubes. The piston sampler (Practice D6519) uses a thin-walled tube. However, the piston samplers are designed to recover soft soils and low-plasticity soils and the thin-walled tubes used must be of lower C_r of 0.0 to 0.5 %. Other piston samplers, such as the Japanese and Norwegian samplers, use thin-walled tubes with 0 % C_r (see Appendix X1).

5.4.1 Some rotary soil core barrels (Practice D6169-Pitcher Barrel), used for stiff to hard clays use thin-walled tubes. These samplers use high C_r tubes of 1.0 to 1.5 % because of core expansion and friction.

5.4.2 This standard may not address other composite double-tube samplers with inner liners. The double-tube samplers are thicker walled and require special considerations for an outside cutting shoe and not the inner thin-walled liner tube.

5.4.3 There are some variations to the design of the thin-walled sampler shown on Fig. 2. Figure 2 shows the standard sampler with a ball check valve in the head, which is used in fluid rotary drilled holes. One variation is a Bishop-type thin-walled sampler that is capable of holding a vacuum on the sampler to improve recovery (**1, 2**). This design was used to recover sand samples that tend to run out of the tube with sampler withdraw.

5.5 The thin-walled tube sampler can be used to sample soft to medium stiff clays[5]. Very stiff clays[5] generally require use of rotary soil core barrels (Practice D6151, Guide D6169). Mixed soils with sands can be sampled but the presence of coarse sands and gravels may cause soil core disturbance and tube damage. Low-plasticity silts can be sampled but in some cases below the water table they may not be held in the tube and a piston sampler may be required to recover these soils. Sands are much more difficult to penetrate and may require use of smaller diameter tubes. Gravelly soils cannot be sampled and gravel will damage the thin-walled tubes.

5.5.1 Research by the US Army Corps of Engineers has shown that it is not possible to sample clean sands without disturbance (**2**). The research shows that loose sands are densified and dense sands are loosened during tube insertion because the penetration process is drained, allowing grain rearrangement.

5.5.2 The tube should be pushed smoothly into the cohesive soil to minimize disturbance. Use in very stiff and hard clays with insertion by driving or hammering cannot provide an intact sample. Samples that must be obtained by driving should be labeled as such to avoid any advanced laboratory testing for engineering properties.

5.6 Thin-walled tube samplers are used in mechanically drilled boreholes (Guide D6286). Any drilling method that ensures the base of the borehole is intact and that the borehole walls are stable may be used. They are most often used in fluid rotary drill holes (Guide D5783) and holes using hollow-stem augers (Practice D6151).

5.6.1 The base of the boring must be stable and intact. The sample depth of the sampler should coincide with the drilled depth. The absence of slough, cuttings, or remolded soil in the top of the samples should be confirmed to ensure stable conditions (7.4.1).

5.6.2 The use of the open thin-walled tube sampler requires the borehole be cased or the borehole walls must be stable as soil can enter the open sampler tube from the borehole wall as it is lowered to the sampling depth. If samples are taken in uncased boreholes the cores should be inspected for any sidewall contamination.

5.6.3 Do not use thin-walled tubes in uncased fluid rotary drill holes below the water table. A piston sampler (Practice D6519) must be used to ensure that there is no fluid or sidewall contamination that would enter an open sampling tube.

5.6.4 Thin-walled tube samples can be obtained through Dual Tube Direct Push casings (Guide D6282).

[5] Soil Mechanics in Engineering Practice, Terzaghi, K. and R.B Peck, (1967) Second Edition, John Wiley & Sons, New York, Table 45.2, pg. 347.

5.6.5 Thin-walled tube samples are sometimes taken from the surface using other hydraulic equipment to push in the sampler. The push equipment should provide a smooth continuous vertical push.

5.7 Soil cores should not be stored in steel tubes for more than one to two weeks, unless they are stainless steel or protected by corrosion resistant coating or plating (6.3.2), see Note 1. This is because once the core is in contact with the steel tube, there are galvanic reactions between the tube and the soil which generally cause the annulus core to harden with time. There are also possible microbial reactions caused by temporary exposure to air. It is common practice to extrude or remove the soil core either in the field or at the receiving laboratory immediately upon receipt. If tubes are for re-use, soil cores must be extruded quickly within a few days since damage to any inside coatings is inevitable in multiple re-use. Extruded cores can be preserved by encasing the cores in plastic wrap, tin foil, and then microcrystalline wax to preserve moisture.

5.7.1 Soil cores of soft clays may be damaged in the extrusion process. In cases where the soil is very weak, it may be required to cut sections of the tube to remove soil cores for laboratory testing. See Appendix X1 for recommended techniques.

NOTE 1—The one to two week period is just guideline typically used in practice. Longer time periods may be allowed depending on logistics and the quality assurance requirements of the exploration plan.

NOTE 2—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective sampling. Users of this practice are cautioned that compliance with Practice D3740 does not in itself ensure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors.

6. Apparatus

6.1 *Drilling Equipment*—When sampling in a boring, any drilling equipment may be used that provides a reasonably clean hole; that minimizes disturbance of the soil to be sampled; and that does not hinder the penetration of the thin-walled sampler (Guide D6286). Open borehole diameter and the inside diameter of driven casing or hollow stem auger shall not exceed 3.5 times the outside diameter of the thin-walled tube.

6.2 *Sampler Insertion Equipment,* shall be adequate to provide a relatively rapid continuous penetration force.

6.3 *Thin-Walled Tubes*—The tubes are either steel or stainless steel although other metals may be used if they can meet the general tolerances given in Table 2 and have adequate strength for the soil to be sampled. Electrical Resistance Steel welded tubing meeting requirements of Specification A513/A513M are commonly used but it must meet the strict the SSID (Special Smooth Inside Diameter) and DOM (Drawn Over Mandrel) tolerances. Table 2 is taken from older versions of this standard, and is in general agreement with Specification A513/A513M with tubes meeting SSID and DOM requirements. Seamless steel tubing (Specification A519) meeting requirements of Table 2 may avoid problems associated with welded tube, such as improper or poor quality welds, and will have better roundness (ovality). Tubes shall be clean and free of all surface irregularities including projecting weld seams. Other diameters may be used but the tube dimensions should be proportional to the tube designs presented here. Tubes may be supplied with a light coating of oil to prevent rusting in storage. Measure the inside and outside diameters, and diameter of the cutting edge to check for ovality and C_r (6.3.2) with micrometers to ascertain that tubes meet these general tolerance requirements.

TABLE 2 Dimensional Tolerances for Thin-Walled Tubes

Nominal Tube Diameters from Table 1[A] Tolerances						
Size Outside Diameter	2 in.	[50 mm]	3 in.	[75 mm]	5 in.	[125 mm]
Outside diameter, D_o	+0.007 -0.000	+0.179 -0.000	+0.010 -0.000	+0.254 -0.000	+0.015 -0.000	0.381 -0.000
Inside diameter, D_i	+0.000 -0.007	+0.000 -0.179	+0.000 -0.010	+0.000 -0.254	+0.000 -0.015	+0.000 -0.381
Wall thickness	±0.007	±0.179	±0.010	±0.254	±0.015	±0.381
Ovality	0.015	0.381	0.020	0.508	0.030	0.762
Straightness	0.030/ft	2.50/m	0.030/ft	2.50/m	0.030/ft	2.50/m

[A]Intermediate or larger diameters should be proportional. Specify only two of the first three tolerances; that is, D_o and D_i, or D_o and Wall thickness, or D_i and Wall thickness.

6.3.1 *Length of Tubes*—See Table 1, 7.5.1 and Appendix X1. Use tubes at least 3 in. [75 mm] longer than the design push length to accommodate slough/cuttings.

6.3.2 *Wall Thickness of Tubes*—Table 1 shows typical wall thickness for the different diameter tubes. For heavy duty or anticipated re-use, the wall thickness can be increased. For example, a 3 in. [75 mm] tube may be increased from Bwg 16 (0.065 in.) to Bwg 14 (0.083 in). If tubes are to be re-used, they must be thoroughly cleaned and inspected prior to each re-use. Do not re-use tubes that are bent or out of round, or have damaged cutting edges, inside corrosion or corrosion coating damage. Repair re-used tube damage to the cutting edges that would disturb or obstruct passage of the core using a file to maintain a sharp cutting edge.

6.3.3 *Inside Clearance Ratio (C_r)*—Sample tubes are manufactured with the inward rolled end and machine cut inside diameter, De, to clearance ratios ranging from 0.5 to 1.0 % (Fig. 1). Special order tubes of less than 0.5%. Select the proper C_r for the soil to be tested when ordering tubes based on site conditions. Clearance ratio ranges from 0 % for very soft clays to 1.5 % for stiff soils as discussed in 5.2 and Appendix X1. In the field, if there is evidence of soil disturbance such as loose soil within the tube, samples falling out, compressed or expanded sample lengths, etc., change the C_r or push length.

6.3.3.1 A recommended tube for very soft clays with 0% C_r for 3-in. [75-mm] sample tubes is shown on Fig. 3 showing the recommended cutting angle. These special order tubes do not require the end rolling process.

6.3.4 *Corrosion Protection*—Subsection 5.7 recommends prompt extrusion of soil cores with no corrosion resistant coating. Corrosion, whether from galvanic or chemical reaction, can damage both the thin-walled tube and the soil sample. Severity of damage is a function of time as well as interaction between the sample and the tube. Thin-walled tubes should have some form of protective coating, unless the soil is

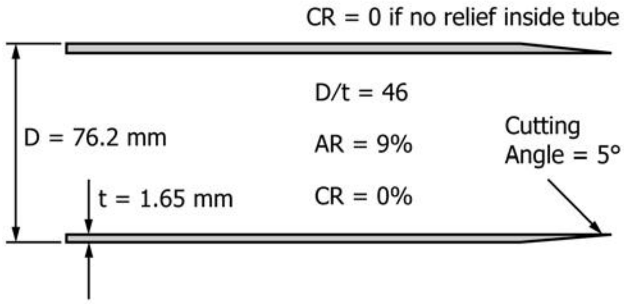


FIG. 3 Schematic of Standard 3-in. [75-mm] Thin-Walled Tube Modified by Removing the Beveled Cutting Edge and Machining a Five-Degree Cutting Angle (DeGroot and Landon (6)).

to be extruded in less than seven days. Organic or inorganic lubricants like penetrating oil and non-stick cooking spray have been used to lubricate the tube prior to sampling and also aid in extrusion and reduce friction. Tubes have been coated with lacquer or epoxy for reuse, but lacquer may not be suitable for longer storage periods and must be inspected for inside wear.

6.3.4.1 *Corrosion Resistant Tubing and Coatings*—Stainless steel and brass tubes are resistant to corrosion. Other types of coatings to be used may vary depending upon the material to be sampled. Plating of the tubes or alternate base metals may be specified. In general the coating should be of sufficient hardness and thickness to resist scratching that can occur from quartz sand particles, Nickel Electroless plating (Specification B733) has been used with good results. Galvanized tubes are often used when long term storage is required.

6.4 *Sampler Head,* serves to couple the thin-walled tube to the insertion equipment and, together with the thin-walled tube, comprises the thin-walled tube sampler. The sampler head shall contain a venting area and suitable ball check valve with the venting area to the outside equal to or greater than the area through the ball check valve. In some special cases, a ball check valve may not be required but venting is required to avoid sample compression. Fluid ports shall be designed to pass drill fluid or water through with minimal back pressure for push rates up to 1 ft [0.3 m] per second (fast push rate, 7.5).

7. Procedure

7.1 Remove loose material from the center of a casing or hollow stem auger as carefully as possible to avoid disturbance of the material to be sampled. If groundwater is encountered, maintain the liquid level in the borehole at or above groundwater level during the drilling and sampling operation.

7.2 Bottom discharge bits are not permitted. Side discharge bits may be used, with caution. Jetting through an open-tube sampler to clean out the borehole to sampling elevation is not permitted.

NOTE 3—Roller bits are available in downward-jetting and diffused-jet configurations. Downward-jetting configuration rock bits are not acceptable. Diffuse-jet configurations are generally acceptable.

7.3 Prepare and inspect the sampling tube and secure to the sampling head and drill rods. If desired or required, lubricate the inside of the tube just prior to sampling (see 6.3.4). Attachment of the head to the tube shall be concentric and coaxial to ensure uniform application of force to the tube by the sampler insertion equipment.

7.4 Lower the sampling apparatus so that the sample tube's bottom rests on the bottom of the hole and record depth to the bottom of the sample tube to the nearest 0.1 ft [0.03 m].

7.4.1 The depth at which the tube rests should agree with the previous depth of cleanout using the drill bit to within 0.2 to 0.4 ft [50 to 100 mm], indicating a stable borehole. If the depth is less than the cleanout depth there could be excessive cuttings, slough/cave, or heave of the borehole and the borehole must be re-drilled, re-cleaned and stabilized for sampling. If the depth is deeper than the cleanout depth this may be normal because the thin-walled tube will penetrate partially under the weight of the rods. If the sampler penetrates significantly while resting at the base of the boring, adjust (shorten) the push length.

NOTE 4—Using a piston sampler (D6519) may alleviate many of the problems listed above. It is useful if there is excessive slough collected in the open thin wall tubes in unstable boreholes. With the piston locked in place, the sampler can generally be pressed through slough or cuttings to the cleanout depth without sample contamination with disturbed soil.

7.4.1.1 Keep the sampling apparatus plumb during lowering, thereby preventing the cutting edge of the tube from scraping the wall of the borehole.

7.5 Advance the sampler without rotation by a continuous relatively rapid downward push using the drill head and record length of advancement to the nearest 1 in. [25 mm] or better. The push should be smooth and continuous. It should take less than 15 seconds to push a typical 3-ft [1-m] sample tube. Note any difficulties in accomplishing the required push length.

7.5.1 Determine the length of advance by the resistance and condition of the soil formation. In no case shall a length of advance be greater than the sample-tube length minus an allowance for the sampler head and a minimum of 3 in. [75 mm] for sludge and end cuttings.

7.5.2 If the drill equipment is equipped with a pressure gauge that reads the reaction to pushing at a smooth rate, this pressure can be recorded and noted during the sampling process. The noting of the difficulty or ease of pushing could be valuable to select samples for lab testing. Low pressure pushes may indicate softer or weaker soils.

NOTE 5—The mass of sample, laboratory handling capabilities, transportation problems, and commercial availability of tubes will generally limit maximum practical lengths to those shown in Table 1.

7.5.3 When the soil formation is too hard for push-type insertion, use rotary soil core barrels for stiff to hard deposits for obtaining intact samples. If a tube must be driven then record the driving method and label the tube "driven sample."

7.6 Withdraw the sampler from the soil formation as carefully as possible in order to minimize disturbance of the sample. There is no set requirement for removing the tube. The process used should avoid the loss of core and recover a full sample. Typical practice uses a waiting period of 5 to 15 minutes after sampling before withdraw. This is to both dissipate excess pore pressures from the push and to build some adherence/adhesion of the soil core inside the tube. Where the soil formation is soft, a delay before withdraw of the sampler may improve sample recovery. After the waiting period, typical practice is to rotate the sampler one revolution while in-place to shear off the bottom of the sample and relieve water or suction pressure prior to retraction. The waiting period and the shearing process may not be practical in some cases, such as deep marine sampling, and the sample can be removed without these steps as long as sample recovery is good.

7.6.1 Sometimes lower plasticity soils will fall out of the tube when the tube clears the water level inside the casing. If this occurs use a piston sampler (D6519) and/or reduce the C_r of the thin-walled tube. A lesser desired alternative is to maintain the borehole fluid level as the sample is retracted, and use a steel sheet plate or plywood to try to catch the soil core when the tube clears the fluid.

7.7 *Tube Re-Use*—If tubes are to be re-used, the soil cores must be extracted promptly and the tubes should be thoroughly cleaned using a high pressure washer or hand held cleaner that can reach fully inside the tube. Inspect the tubes for damage and discard any damaged tubes and repair the cutting edge if damaged (6.3.2).

8. Sample Measurement, Sealing and Labeling

8.1 Upon removal of the tube, remove the drill cuttings in the upper end of the tube using an insider diameter cutting tool and measure the length of the soil sample recovered to the nearest 1 in. [25 mm] or better in the tube. Recovery may be recorded, but may not be reliable due to uncertainty in removal of the upper slough, but it is important to note core loss and slippage. Seal the upper end of the tube. Remove at least 1 in. [25 mm] of material from the lower end of the tube. Use this material for soil description in accordance with Practice D2488. Measure the overall sample length to the nearest 1 in. [25 mm] or better. Seal the lower end of the tube. Alternatively, after measurement, the tube may be sealed without removal of soil from the ends of the tube.

NOTE 6—If the tubes are mass tared and their inside diameters are known, the mass of tube and soil can be determined and using the diameter and length for volume, the wet density of the soil core can be calculated. Further, the dry density can be determined using water content from the bottom trimmings. This extra information can be valuable in assisting lab selection of tubes for testing. The procedure is outlined in the Earth Manual (**3**).

8.1.1 *Sealing Tubes*—Seal and confine the soil in the tubes using either expandable packers or waxed wood discs inside the tube. Tubes sealed over the ends are generally poor quality, as opposed to those sealed with expanding packers, and should be provided with spacers or appropriate packing materials, or both prior to sealing the tube ends to provide proper confinement. Packing materials must be nonabsorbent and must maintain their properties to provide the same degree of sample support with time.

8.1.2 Samples of soft or very soft clays may require tube cutting in the laboratory for removal as opposed to extrusion (Appendix X1).

8.1.3 *Extruded Cores*—Depending on the requirements of the exploration, field extrusion and packaging of extruded soil samples can be performed. This allows for physical examination, photographing, and classification of the sample. Samples are extruded in special device equipped which includes hydraulic jacks with properly sized platens to extrude the core in a smooth continuous speed. In some cases, further extrusion may cause sample disturbance reducing suitability for testing of engineering properties. In other cases, if damage is not significant, cores can be extruded and preserved for testing (Practice D4220). Bent or damaged tubes should be cut off before extruding. Preservation of intact sections of core is normally accomplished with a layer of plastic wrap and several layers of tin foil and wax to support the soil core. The extruded cores can be placed in PVC half rounds to aid in stability. Do not seal damaged portions of the extruded cores, generally the end sections, if they are not suitable for testing.

8.2 Prepare and immediately affix labels or apply markings as necessary to identify the sample (see Section 9). Ensure that the markings or labels are adequate to survive transportation and storage.

9. Report: Field Data Sheet(s)/Log(s)

9.1 The methodology used to specify how data are recorded on the test data sheet(s)/log(s), as given below, is covered in 1.6.

9.2 Record the following general information that may be required for preparing field logs in general accordance with Guide D5434. This guide is used for logging explorations by drilling and sampling. Some examples of the information required include;

9.2.1 Name and location of the project,

9.2.2 Boring number,

9.2.3 Log of the soil conditions,

9.2.4 Location of the boring,

9.2.5 Method of making the borehole,

9.2.6 Name of the drilling foreman and company,

9.2.7 Name of the drilling inspector(s),

9.2.8 Date and time of boring-start and finish,

9.2.9 Description of thin-walled tube sampler: size, type of metal, type of coating,

9.2.10 Method of sampler insertion: push or drive, and any difficulties in accomplishing the required push length,

9.2.11 Push pressures if recorded,

9.2.12 Label any driven samples (7.5.3),

9.2.13 Method of drilling, size of hole, casing, and drilling fluid used,

9.2.14 Soil description in accordance with Practice D2488,

9.2.15 For each sample, label tubes with drill hole number and depth intervals at top and bottom and for extruded preserved cores, label the "top" and "bottom" for orientation along with the depths.

9.3 Record at a minimum the following sample data:

9.3.1 Surface elevation or reference to a datum to the nearest 0.1 ft [0.3 m] or better,

9.3.2 Drilling depths and depth to the nearest 0.1 ft [0.3 m] or better,

9.3.3 Depth to groundwater level: to the nearest 0.1 ft [0.3 m] or better, plus date(s) and time(s) measured,

9.3.4 Depth to the bottom or top of sample to the nearest 0.1 ft [0.03 m] and number of sample, 9.3.5 Length of sampler advance (push), to the nearest 0.05 ft [25 mm] or better, and

9.3.6 Recovery: length of sample obtained to the nearest 0.05 ft [25 mm] or better.

10. Keywords

10.1 geologic explorations; intact soil sampling; soil sampling; soil exploration; subsurface explorations; geotechnical exploration

APPENDIX

X1. INFORMATION REGARDING FACTORS AFFECTING THE QUALITY OF THIN-WALLED TUBE SOIL SAMPLING

(Nonmandatory Information)

X1.1 The most complete early study of soil sampling was performed by J.M. Hvorslev in 1949 (**1**) for the US Army Corps of Engineers (USACE). This study was comprehensive and reviewed all sampling methods including intact soil sampling. In this study he traces the origins of the thin-walled tube sampling practice and details regarding the design of thin-walled tubes to minimize disturbance of soils sampled for laboratory testing. This classic work is no longer available in print, however the USACE revised their Engineer Manual EM-1101-1-1804 in 2001 and it provides an excellent summary of this work.

X1.2 Either operator or mechanical factors affect the quality of thin-walled tube samples. Of course, the operator should use due care to properly drill the boreholes to ensure the soil is not disturbed at the base and to push the sampler at a smooth steady rate for proper sampling. Generally drilling too fast or pushing too fast can result in damage to the resulting sample.

X1.3 Mechanical factors include the sample diameter, sample push length, area ratio, Clearance Ratio, and edge cutting angle. It was clear in Hvorslev's work that large diameter samples 5 in. [125 mm] provided higher quality samples. The majority of soil sampling practice prefers the use of the smaller 3-in. [75-mm] tubes. When using these smaller tubes, more attention needs to be given to the factors listed above. If there are problems with sample quality, one should first consider going to a larger diameter sampler.

X1.4 Hvorslev defined and evaluated the Clearance ratio, C_r, of the sampler. Hvorslev suggested that C_r of 0 to 1 % may be used for very short samples, values of 0.5 to 3 % could be used for medium length samples, and larger may be needed for longer samples. If limited to a certain clearance ratio, the length of push can be shortened if there appears to be sample quality problems.

X1.5 For most soils, a C_r of 0.5 to 1.0 % can be used. C_r should be adjusted for the soil formation to be sampled. In general softer soils require lower C_r and stiffer soils require a higher C_r as they have a tendency to expand. Cohesive soils and slightly expansive soils require larger C_r, while soils with little or no cohesion require little or no clearance ratio.

X1.6 Piston samplers are designed to sample difficult to recover non-plastic or low plasticity soils and soft to very soft clays and thus require use of C_r of 0 to 0.5 %. Use of commercially supplied tubes with 1 % clearance ratio will result in complete core loss in low plasticity soils. A smaller clearance ratio of 0 to 0.5 % must be used or piston samplers can be used. Thin-walled tubes for rotary soil core barrels such as the Pitcher Sampler used in stiff soils generally require higher C_r of 1-2 % (**2**). Use of a larger C_r allows for larger push lengths. The US Army Corps of Engineers uses 5 in. [125 mm] diameter piston sampler tubes pushed 4 ft [1.2 m] with commercially available 0.5 to 1 % C_r with good success in soft normally consolidated clays. Having the larger diameter core allows one to tolerate some core annulus disturbance with good specimens still in the central portion of the core. Core annulus disturbance can be evaluated in lake deposits by allowing sections of cores to dry and evaluating the lake bed layering with attention to the damage at the annulus of the sample.

X1.7 Manufacturers supply thin-walled tubes with pre-made C_r of 0.5 to 1.0 %. You must custom order other clearance ratios. If you are going to sample a soft formation you need to custom order tubes with lower clearance ratios.

X1.8 Table X1.1 below shows some recommended C_r for various soil types and moisture conditions and was included in ASTM D6169 (Table 7). These are estimates from experienced drillers and may be used as a guide but the estimates are based on large diameter samples 5-in. [125 mm] with short push lengths (2.5 ft [0.8 m]) and may not apply to smaller diameter tubes.

X1.9 Research has been conducted comparing the ASTM D1587 thin-walled tubes to other samplers used around the world. Tanaka, et al. (**7**) compared the ASTM thin-walled tube to other samplers including the Japanese Piston sampler, Laval Sampler and NGI samplers. The results of this research showed very poor results with ASTM 3-in. [75-mm] tubes with very low Unconfined Compression test results (D2166). There are other studies on sample quality comparing the ASTM thin-walled tube to other samplers, but all these studies neglected

TABLE X1.1 General Recommendations for Thin-Wall, Open Push-Tube Sampling

Soil type	Moisture condition	Consistency	Length of push, cm [in.]	Bit clearance ratio, %	Push tube sampler recovery	Recommendation for better recovery
Gravel			Thin-wall, open push tube samplers not suitable			
Sand	Moist	Dense	46 [18]	0 to ½	Fair to poor	
Sand	Moist	Loose	30 [12]	½	Poor	Recommend piston sampler
Sand	Saturated	Dense	45 to 60 [18 to 24]	0	Poor	Recommend piston sampler
Sand	Saturated	Loose	30 to 45 [12 to 18]	0	Poor	Recommend piston sampler
Silt	Moist	Firm	45 [18]	½	Fair to good	
Silt	Moist	Soft	30 to 45 [12 to 18]	½	Fair	
Silt	Saturated	Firm	45 to 60 [18 to 24]	0	Fair to poor	Recommend piston sampler
Silt	Saturated	Soft	30 to 45 [12 to 18]	0 to ½	Poor	Recommend piston sampler
Clay and shale	Dry to saturated	Hard	Thin wall, open push tube sampler not suitable			Recommend double-tube sampler
Clay	Moist	Firm	45 [18]	½ to 1	Good	
Clay	Moist	Soft	30 to 45 [12 to 18]	1	Fair to good	
Clay	Saturated	Firm	45 to 60 [18 to 24]	0 to 1	Good	
Clay	Saturated	Soft	45 to 60 [18 to 24]	½ to 1	Fair to poor	Recommend piston sampler
Clay	Wet to saturated	Expansive	45 to 110 [18 to 44]	½ to 1-½	Good	

the determination of C_r of the thin-walled tubes used. Thin-walled tubes were likely purchased from manufacturers with the typical 0.5 to 1 % clearance ratio which is not recommended for soft clays.

X1.10 Lunne, et al., (**8**) published a study of samplers where the clearance ratios were noted. The study confirms that larger push lengths can be used successfully with higher C_r in the larger diameter the NGI sampler uses this.

X1.11 DeGroot and Landon (**6**) published recommendations for thin-walled tube sampling of soft clays. The recommendations stress the lower clearance ratios required for thin-walled tubes that are incorporated into this revision of the standard. Also contained in this report are recommendations by Ladd and DeGroot (**4**) that detail how to remove sections of the thin-walled tube without extrusion of the core.

X1.12 Evaluations of sample quality

X1.12.1 Soil samples inside the tubes can be readily evaluated for disturbance or other features such as presence of fissures, inclusions, layering or voids using X-ray Radiography (D4452) if facilities are available. The X-ray method is excellent for checking for badly disturbed specimens and also very advantageous to locate where to cut specimens for laboratory testing. Field extrusion of soil cores and also show any indications of excessive disturbance. When performing field extrusion and preservation, do not preserve areas that are excessively damaged, only seal and wax the most intact sections of the core.

X1.12.2 In the laboratory disturbance of the soil cores and overall sample quality can be evaluated using the One-Dimensional Consolidation test (D2435) using methods proposed by Andressen and Kolstad (**5**). The amount of recompression up to the estimated pre-stress or existing ground stress should be small in high quality samples. Recompression in consolidated shear strength tests can also be used.

(1) Hvorslev, M.J., 1949, Subsurface Exploration and Sampling of Soils for Engineering Purposes, report of a research project of the Committee on Sampling and Testing, Soil Mechanics and Foundations Division, American Society of Civil Engineers, Waterways Experiment Station, US Army Corps of Engineers, Vicksburg Mississippi, re-published by Engineering Foundation 1960

(2) Engineer Manual 1101-1-1804, 2001, Geotechnical Investigations, US Army Corps of Engineers, Washington D.C. http://140.194.76.129/publications/eng-manuals/

(3) Bureau of Reclamation, 1990, Earth Manual, 3rd Edition, Part 2, Test method USBR 7105 on Undisturbed Sampling of Soil by Mechanical Methods, Bureau of Reclamation, Denver CO.

(4) Ladd, C.C., and D.J., DeGroot, "Recommended Practice for Soft Ground Site Characterization: Arthur Casagrande Lecture," 12th Pan-American Conference on Soil Mechanics and Geotechnical Engineering, Massachusetts Institute of Technology, Cambridge, MA, June 22-25, 2003, revised May 9 2004.

(5) Andressen, A. AA., and Kolstad, P., 1979, "The NGI 154-mm Samplers for Undisturbed Sampling of Clays and representative Sampling of Coarser Materials," State of the Art on Current Practice of Soil Sampling, Proceedings of the International Symposium of Soil Sampling, The Subcommittee on Soil Sampling, International Society for Soil Mechanics and Foundation Engineering.

(6) DeGroot, D., J., and Landon, M., M., "Synopsis of Recommended Practice for Sampling and Handling of Soft Clays to Minimize Sample Disturbance," Geotechnical and Geophysical Site Characterization, Huang & Mayne (eds), Taylor and Francis Group, London, 2008

(7) Tanaka, H., Sharma, P., Tsuchida, T., and Tanaka, M., "Comparative Study on Sample Quality Using Several Types of Samplers," Soils and Foundations, Vol. 36, No. 2, 57-68, June 1996

(8) Lunne, T., Berre, T., Andersen, K.H., Strandvick, S., and M. Sjursen, (2006), "Effects of Sample Disturbance and Consolidation Procedures on Measured Shear Strength of Soft Marine Norwegian Clays, Can. Geotech. J 43: 726-750

Appendix J

Laboratory Quality Assurance Project Plan

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Environmental Quality Policy Manual

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Table of Contents

Revision Log:

Revision: 14		Effective Date: This version
Section	**Justification**	**Changes**
Revision Log	Formatting requirement per 1-P-QM-QMA-9017356	Removed revision logs up to the previous version
Throughout document	Title change	Update QA Manager references to be QA Director
Throughout document	Clarification	General rewording for better clarity and flow of information
Section 1.3	Reflect current version	Revised mission statement
Section 1.4	Enhancement	Revised display of information
Section 2.4	Additional scope of document	Added service centers associated with Lancaster to the scope of this document
Section 2.6	Process change	Remove reference to quarterly reports as this information is communicated to management through different means
Section 2.11.1	Process change	Added "Note" regarding training for seasonal and temporary staff
Section 2.16	Unnecessary statement	Removed reference to Eurofins sister laboratories
Section 2.17	Clarification/Process change	Clarified that the Ethics Statement is signed annually Changed Ethics Committee to Ethics hotline service
Section 3.1	Changes to campus	Updated description of campus to reflect current state
Section 3.3	Clarification	Added IT systems to the areas addressed by disaster recovery
Section 3.4	Added information	Clarified actions taken if there are adverse environmental conditions in the facility
Section 4.2	Clarification	Added explanation for applying signatures electronically to document through the document control interface
Section 5.1	Added information	Revised to include information on the bottle lot checks
Sections 5.4 & 5.5	Enhancement	Added explanations of the bar code reading process used in sample tracking and the individual bottle code tracking
Sections 5.4, 6.1 & 6.3	Added information	Specified that samples and standards/reagents are stored separately.
Section 6.3	Updated requirement	Added information regarding the need for ISO Guide 34 and ISO 17025 approved materials.
Section 6.4.4	Clarification	Added notation for reporting noncompliant data when approved by the client and comments added to the report.
Section 6.5.1.2	Added information	Specified that passwords must adhere to the Eurofins Password Policy and must be "strong: passwords
Section 6.5.2	Enhancements	Added information on the software change request, periodic reviews and retirement documents. Generalized the explanation on validation plans.
Section 8.1	Reflects current process	Changed the listing of services to current offerings and updated the website link for certification
Section 10.1	Enhancement	Added Bottle orders and clarified to reflect current flow
Section 11.1	Clarification	Added ability of QA to stop work for critical internal audit issues
Section 11.2	Process change	Added electronic means of routing documents; removed quarterly report reference
Section 11.5	Unnecessary statement	Removed the need to stamp documents as confidential
Section 12.1	Clarification	Explanations added regarding actions for noncompliant QC data; removed quarterly report reference
Section 12.2	Updated process	Information on the ICAR process was revised to reflect the current practice using Jira
Section 12.3	Clarification	Added information regarding QA trend evaluation of client concerns and routing of the client satisfaction survey

Revision: 14		Effective Date: This version
Section 12.4	Process change	Revised to remove references to the Ethics Committee and add information on the Ethics Hotline service; removed quarterly report reference
Section 12.4	Enhancement	Added information about use of Project Cycle to proactively ensure meeting the needs of the client
Section 13.4	Process change	Removed reference to subcontract warranty statement and added Laboratory Analytical Services Subcontract form
Appendices A-F and J-I	Updated for current information	Updated to reflect current SOPs, personnel, methods, etc.

Revision: 13		Effective Date: Aug 8, 2014
Section	**Justification**	**Changes**
Revision Log	Formatting requirement per 1-P-QM-QMA-9017356	Removed revision logs up to the previous version
Throughout Document	Reflect re-identification of documents in EtQ	Replaced all prior Level 1, 2, 3, and 4 document numbers (analyses excluded) with EDR numbers
Title Page	Regulatory compliance	Added text for address, phone, reviewer/approver titles (previously listed on hardcopy covers and pre-EtQ versions)
Section 1	Updated training requirements	Removed requirement for all employees to read the appendices, they are available as resources; required for dept. 4052 only.
Section 1.2	Regulatory compliance	Inserted additional ISO17025 text at opening and closing of Quality Policy Statement
Section 2.1.1	New Section	Summarize processes to ensure business continuity and contingency plans
Section 2.2	Reflect current structure	Moved summation of technical director and QA manager to this section; changed employee responsible for daily operation from COB to VP. Throughout document, clarified management structure to include VP.
Section 2.6	Added process	Added ability for management and/or QA to issue a stop work notice.
Section 2.16	Regulatory compliance	Inserted additional ISO17025 text regarding ensuring impartiality, operation integrity, etc.
Section 3	Added building	Added building D
Section 4.2	Clarification	Noted that interim amendments to controlled procedures are not allowed.
Section 5.5	Added information	Noted that minimum sample retention period is 2 weeks form reporting
Section 6.4	Clarification	Standardized use or the terminology for equipment (supporting units) vs instruments (data producing units)
Section 6.5.1.9	New section	Added to address passwords and audit trails for systems used to process electronic data
Section 6.5.2	Clarification	Clarified SDLC processes
Section 8.1	Added information	Added reference to laboratory website for all current accreditation records
Section 10.2	Added information	Added information regarding electronic data, signatures, and audit trails
Section 10.4	Regulatory compliance	Added DoD reporting requirements for DL, LOD, LOQ
Section 10.5	Clarification	Clarified process and intent of data review
Section 10.7	Updated process	Added process for identification of accreditation status Noted use of LlabWeb for secure data transfer
Section 12.1	Added process	Added ability for management and/or QA to issue a stop work notice.

Revision: 13		**Effective Date:** Aug 8, 2014
Section 12.4	Clarification, new process	Clarified processes that address preventive action; changed “PPI” to “Lean”
Section 13.2	Clarification	Added detail on project evaluations
13.4	Added detail	Added information regarding the subcontractor warranty and the need to ensure subcontractor can meet accreditation requirements
Appendices A-J	Updated for current information	Updated to reflect current SOPs, personnel, methods, etc.

INTRODUCTION

This *Quality Policy Manual* is based upon Eurofins Lancaster Laboratories Environmental LLC's (herein referred to as the laboratory) overall business and management philosophies, mission, and goals. This manual is written to present the policies employed by the laboratory as well as the support departments that serve the environmental laboratories and to comply with the requirements of the National Environmental Laboratory Accreditation Program, ISO 17025, and the Department of Defense (DoD). These policies define the "what" we do with emphasis on management's responsibilities and commitment to quality. Governing SOPs are in place within the organization, to ensure the proper execution of this policy document (refer to Appendix A). This manual is required reading for laboratory personnel. The appendices are available resources to all personnel but are not required reading for all employees. The most recent and up-to-date *Quality Policy Manual* and all referenced documents are available to all laboratory personnel who work in or support the laboratory. The laboratory actively strives for continuous improvement of its quality systems to better serve our clients.

1.1. Mission Statement

The laboratory offers analytical and consulting services in the chemical and biological sciences with comprehensive expertise in environmental laboratory applications. The company mission statement describes the corporate philosophy:

At Eurofins Lancaster Laboratories, Environmental LLC we are people working together to serve the health and environmental needs of society through science and technology. We strive to be the recognized leader in all that we do.

Our mission is to provide independent laboratory services in the chemical and biological sciences with excellent quality and service. As a corporate community, we:

- Deliver quality by fully understanding and always meeting the requirements of those we serve.
- Live our values by relating to our clients, coworkers, shareholders, suppliers, and community in a fair and ethical manner.
- Manage our growth and financial resources so we can serve our clients well, provide a satisfactory return to shareholders, and maintain our meaningful and enriching workplace.

1.2. Quality Policy

The Executive Management Group recognizes quality as a key element of the laboratory's standard of service. The group supports the laboratory's commitment to quality as defined by NELAP, ISO 17025, DoD, and other regulatory agencies (i.e. states) through the strict adherence to the Quality Policy Statement. The Quality Assurance Director wrote the Quality Policy Statement, with final approval from the laboratory Vice-President. The policy cannot be revised without their approval.

The Quality Policy Statement gives employees clear requirements for the production of analytical data. Employees are trained on the components of the Quality Policy Statement during their first day of orientation. Each employee signs the statement upon hire as agreement to implement the policy in all aspects of their work. Employee agreement to any subsequent revisions of the statement is obtained by documented reading and understanding of an agreement to follow the Quality Manual, which contains the current version of the statement. The statement is as follows:

As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients.

We strive to provide the highest quality data achievable by:

- Following all documentation requirements; describing clearly and accurately all activities performed; documenting "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification, analysis, and reporting; establishing an audit trail that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- Emphasizing a total quality management process and commitment to continuous improvement which provides accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only after discussion with the client on the data limitations and acceptability of this approach.
- Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and applicable corrective action; documenting these activities completely, including the reasons for the decisions made.
- Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concern on quality issues to management.

We each take personal responsibility to provide this quality product while meeting the company's high standards of integrity and ethics, understanding that improprieties, such as failure to conduct the required test, manipulation of test procedures or data, or inaccurate documentation will not be tolerated. Intentional misrepresentation of the activities performed is considered fraud and is grounds for termination.

I understand the expectations and commit to implementation of all applicable policies and procedures and to providing quality data.

1.3. Statement of Values

Eurofins Lancaster Laboratories Environmental is a team of people who work together to serve the health and environmental needs of society through science and technology.

At Eurofins Lancaster Laboratories Environmental, our mission is to provide independent laboratory services in the chemical and biological sciences with excellent quality and service. We fulfill our mission by incorporating our values into our work every day.

As a corporate community, we embrace our heritage of integrity and strive to live by the following principles:

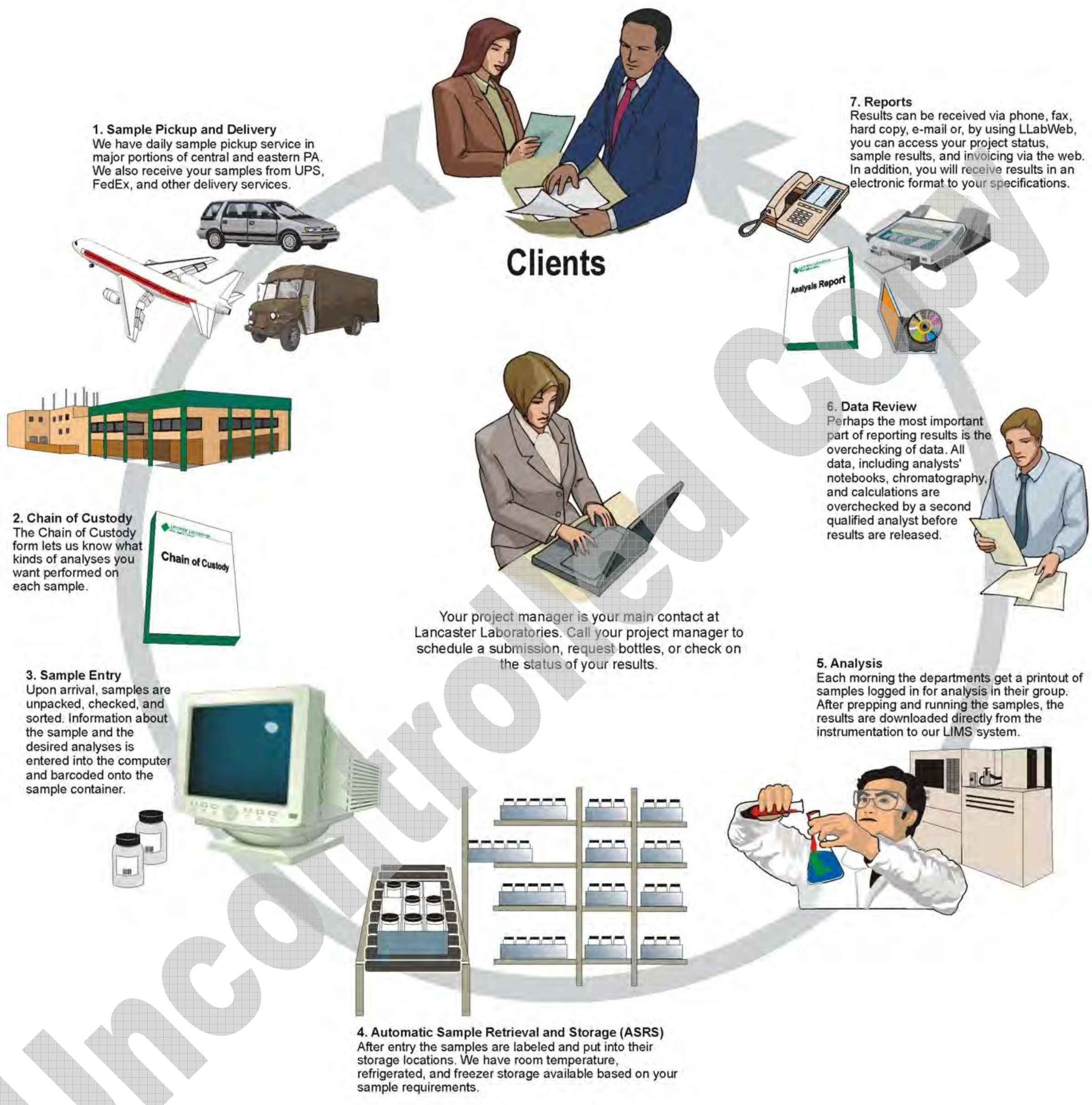
- Fairness and honesty in all our relationships
- Mutual trust
- A respect for ourselves and others
- A sense of caring that leads us to act responsibly toward each other and society, now and in the future
- Loyalty to our clients and one another
- A spirit of open-mindedness as we deal with all
- Dedication to service
- Good stewardship of our resources
- A commitment to flexibility and continuous improvement

We are committed to:

- Delivering quality by fully understanding and always meeting the requirements of those we serve.
- Living our values by relating to our clients, coworkers, shareholders, suppliers and community in a fair and ethical manner.
- Managing our growth and financial resources so we can serve our clients well, provide a satisfactory return to shareholders and maintain our meaningful and enriching workplace.

At Eurofins Lancaster Laboratories Environmental, we each take personal responsibility to live these values in all of our dealings, knowing full well that our pledge may involve difficult choices, hard work and courage.

1.4. Sample Flow-Through Diagram



1.5. Certifications, Accreditations, and Registrations

Accreditation/Certification is the process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications and/or standards. It is the one generally accepted method by which a laboratory such as ours can demonstrate its capability of generating acceptable, professional, quality test results in those areas in which it claims competence. To this end, we have actively sought accreditation by organizations offering it in those areas relevant to our technical expertise. We strive to ensure that the facilities, equipment, procedures, records, and methods used by the laboratory in the testing of environmental samples are in compliance with the requirements of these standards.

Although organizations offering accreditation differ somewhat in the details of their programs, they generally evaluate laboratories in four basic areas: personnel (adequate staffing, education, training, and experience), physical facilities, instrumentation/equipment, and quality assurance program. This evaluation is performed by one or more of the following procedures: periodic on-site inspections of the laboratory by assessors experienced in technical operations, quality systems, and management; periodic analysis of proficiency test samples; and periodic updating of the laboratory's file to reflect changes in personnel, equipment, or services offered. Some states offer reciprocity with other state programs.

Appendix B lists accreditations and registrations held by the laboratory in support of environmental work. Current copies of all scopes of accreditation are available on the laboratory website and are kept on file in the Quality Assurance Department.

2. ORGANIZATION AND PERSONNEL

2.1. Company Overview and History

The laboratory was founded in 1961 by Dr. Earl Hess in response to a need for high quality technical services by the agricultural and industrial communities in southeastern Pennsylvania. Nourished in a culture of quality and caring about all those associated with the business, the corporation became an industry leader known for innovative business practices and people-friendly policies. The company was independently owned until the retirement of Dr. Hess in 1995. At that time, the laboratory was acquired by a publicly held company, Thermo TerraTech, Inc., a Thermo Electron company. Ownership changed in September 2000, when the laboratory was acquired by Goldner, Hawn, Johnson, and Morrison, Inc. (GHJ&M), a private equity investment firm. In August 2005, the laboratory was acquired by Fisher Scientific under their BioPharma Division. On November 9, 2006, Thermo Electron and Fisher Scientific merged to form Thermo Fisher Scientific. In April 2011, Thermo Fisher Scientific sold the laboratory to Eurofins Scientific. Effective July 1, 2013, the Pharmaceutical and Environmental Divisions were split into separate business entities and the company name became Eurofins Lancaster Laboratories Environmental, LLC. The laboratory continues to operate as an independent laboratory and is incorporated by the State of Delaware.

The laboratory provides a wide array of laboratory services to clients working in environmental industries. We strive to offer high quality technical services in the chemical and biological sciences with personal attention to client needs. These services include chemical analyses, microbiological testing, and analytical method development. We are, therefore, a technical service company and do not manufacturer or distribute goods. Our "product" is accurate and timely technical information and our continued existence depends on the quality of the services we offer and efficiency with which we deliver them.

2.1.1 Business Continuity and Contingency Plans

Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur.

Section 2.2 of this document explains the identification of deputies for key management positions. Section 3.3 discusses the disaster recovery plan. Section 6.5 addresses the security and backup of our computer systems. Section 10.8 addresses handling of client records should the company have a change in ownership or go out of business.

2.2. Organizational Structure

The laboratory Vice-President/Technical Director, Duane Luckenbill, is responsible for the daily operations of the laboratory.

The Executive Management Group is defined as the Eurofins Environment Testing US Chairman of the Board and President and Eurofins Lancaster Laboratories Environmental, LLC Vice-President.

The management staff includes directors, managers and group leaders. Organizational charts are presented in Appendix C. A list of key personnel is also provided. The Vice-President and Quality Assurance (QA) Director have identified deputies for all key management personnel.

2.2.1 Technical Director

The Technical Director ensures that the laboratory's policies and objectives for quality of testing services are documented in this quality manual. The Technical Director must assure that the manual is communicated to, understood, and implemented by all personnel concerned.

2.2.2. Quality Assurance Director

The Quality Assurance Director ensures that the quality system is followed at all times. The QA Director reports directly to the Vice-President thus ensuring corrective actions to quality issues are taken promptly and are separate from business decisions. The QA Director has no direct supervisory responsibility for the generation of technical data to avoid any conflict of interest in administrating the QA program. The QA Director has the final authority to stop work that compromises our integrity or data quality. The situation must be investigated and appropriate corrective action must be put in place before the QA Director will authorize the resumption of work. The specific duties of the QA Director are communicated in job plan format.

2.3. Management Responsibilities

Laboratory management duties are outlined for supervisory personnel using a job plan format, which details each individual's responsibilities along with expected results. Typically, management duties include, but are not limited to:

- Personnel hiring and training
- Supervision of personnel
- Providing resources to ensure a work environment free from commercial, financial, and other undue pressures that may adversely affect the quality of their work
- Providing resources to ensure a safe work environment
- Directing daily work operations, including scheduling of work
- Ensuring compliance with the TNI Standards, ISO 17025, Department of Defense Quality Systems Manual, state agency programs, analytical methods, and client requirements.
- Assessing laboratory capacity and workload
- Resource allocation
- Ensuring quality of data produced
- Contributing to the continuous improvement of the laboratory operation
- Ensuring that corrective actions are carried out in an appropriate and agreed upon time-frame.
- Communicating problems and concerns to Senior and Executive Management to enlist a higher level of support for corrections and continuous improvements.
- Maintaining awareness of technical developments and regulatory requirements

2.4. Overview of the Quality Assurance Program

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of NELAP, ISO 17025, DoD, and any other regulatory agencies (i.e. states) in which we hold accreditation. Although the laboratory is a wholly owned subsidiary of Eurofins Scientific, the Quality Assurance and Quality Systems operations described in this manual are specific to the Lancaster site and associated service centers.

The administration of the QA program is the responsibility of the QA Director in cooperation with all levels of management.

The QA program, as directed by executive management, was established to:

- Ensure accountability, accuracy, and traceability of all analytical data generated.
- Ensure that current regulatory, agency, and client requirements are being met.
- Ensure that operating procedures are in place to minimize the possible loss, damage, and tampering with data, in addition to ensuring that raw data is stored in a secured area and is maintained by designated archivists and/or system administrators.
- Ensure that curriculum vitae (CVs) and training records are maintained to document that staff members have the necessary education, training, and experience to perform their job responsibilities and functions.
- Ensure that regulatory training is provided to applicable employees on a routine and ongoing basis.
- Ensure that all procedures are available, controlled, and current.
- Ensure that documentation demonstrates that procedures are carried out in a compliant and effective manner.
- Ensure that all equipment and instrumentation is qualified, maintained, and calibrated, as appropriate, in accordance with written standard operating procedures.

- Ensure that all significant laboratory problems are investigated, evaluated for root cause and corrective action is put in place as documented
- Ensure that an internal audit program is in place to provide on-going monitoring and confirm that laboratory personnel are adhering to standard operating procedures and applicable regulations.
- Ensure that quality issues are brought to the attention of management in a timely manner.

2.5 Quality Assurance Responsibilities

The QA Director assigns tasks with input from the company Vice President. The primary responsibilities of QA include, but are not limited to the following:

- Oversee the laboratories' internal audit program which consists of various audit types and applies to all laboratory activities (technical and administrative).
- Review and approve standard operating procedures and analytical methods.
- Review and approve validation documentation.
- Review non-conforming quality control data
- Perform tracking and trending of quality measurements and report the status and effectiveness of the quality system to management.
- Approve investigation and corrective action reports (ICARs) and audit responses to ensure that they are completed in a timely manner, evaluated for root cause, that corrective actions are implemented as needed and to monitor corrective action for effectiveness.
- Host client and regulatory agencies during facility audits and follow-up to any cited deficiencies.
- Provide regulatory guidance to the laboratory and support areas.
- Monitor Good Laboratory Practice (GLP) regulatory activities.
- Communicate quality issues to management in a timely manner
- Provide and/or coordinate on-going regulatory training (e.g., GLP).
- Participate in the vendor and supplier approval process, including subcontractors.
- Review analytical data for compliance with our procedures.
- Prepare and review QA project plans (QAPPs) as required by EPA and client projects.
- Maintain and update this *Quality Policy Manual*.
- Maintenance of the Laboratory's accreditations, including but not limited to, administration of the proficiency test sample programs, both single and double blinds.
- Communicate (within 30 days) to the relevant state authorities when there are management or facility changes that impact the laboratory. Changes in the technical director must be communicated within 20 days.

2.6. Communication of Quality Issues to Management

The QA Department is responsible for preparing reports to Management to keep them apprised of outstanding quality issues. Reports to management foster communication, review, and refinement of QA activities to ensure that the QA program is adequate to meet regulatory and the laboratory's quality objectives. The following reports are used to communicate quality issues and include, but are not limited to:

- Internal, client, and agency audit reports and corrective action plans
- Proficiency test reports
- Investigation and corrective action reports
- Monthly quality status reports
- Plans for corrective action

Upon review of quality issues, management and/or QA may issue a stop work notice if an issue indicates the potential for a problem on a broader scale with an analysis. The investigation would need to be completed and the issue resolved before work could continue. The information is tracked through our Investigation and Corrective Action Report (ICAR) process.

2.7. Personnel Qualifications and Responsibilities

Full resumes and responsibilities of key personnel are provided in Appendix D.

Due to the number of analysts on staff, entry level chemists, technicians, and support personnel are not included in the resume section. However, all employees have job plans that define their responsibilities. Duties for these personnel typically include:

- Sample storage
- Sample preparations
- Performance of tests
- Calibration, operation, and maintenance of instruments
- Data entry
- Standard and reagent preparation
- Glassware preparation
- Data deliverables preparation

2.8. Relationship of Functional Groups and the Quality Assurance Program

In addition to this *Quality Policy Manual*, aspects of the QA program are documented in a series of standard operating procedures that support the proper execution of this document. Technical operation procedures with required quality components are also in place. A list of the titles of relevant SOPs is provided in Appendix E. There are a variety of mechanisms used to communicate requirements and verify compliance with the QA program, including:

- Management requires that all employees read and be trained in the policies and SOPs that are pertinent to their jobs.
- Employee job plans define individual responsibilities. All job plans include QA aspects, and performance is reviewed annually.
- Laboratory audit findings are circulated to management and require a response and follow-up to items needing corrective action.

- Cross-functional meetings, including representatives from QA, Client Services, Marketing, management, and technical operations are held regularly to review specific projects and quality issues.

2.9. Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the Vice-President, laboratory directors and managers, and the Client Services director and manager. These responsibilities are documented in the individual job plans for these positions.

The laboratory facilities and staff size are very large compared to other laboratories serving the environmental industry. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule is met.

Regularly scheduled meetings are held with upper management, laboratory middle management, Client Services and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory.

Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Sample Information System (LIMS) including turnaround time, and work in-house.

2.10. Identification of Approved Signatories

All data is reviewed and verified prior to release to the client. Based on complexity or regulatory needs, some projects are designated for secondary (technical and/or QA) review of the Analysis Reports and/or data deliverables. Approved signatories for these secondary reviews are defined in the SOP on Data Entry, Verification, and Reporting. Directors, managers, group leaders, and other designated employees (such as QA, project managers, and senior technical staff) are designated to approve/release Analysis Reports. Request for approval of an employee to approve/release reports must be made through the QA Department. These authorized personnel are designated with an asterisk in the personnel list provided in Appendix C.

2.11. Personnel Training

The experience and training received by personnel is of great importance to our clients and regulatory agencies. Curricula Vitae (CVs) and on-going training documentation are available to demonstrate how personnel have been prepared for the tasks they routinely perform. To ensure the highest quality of services at the laboratory, training programs and plans are developed to match skills with job functions. Accurate training documentation is the responsibility of both the employee and their supervisor. On a routine basis, the supervisor reviews and approves training documentation to verify that it is complete and current.

Training requirements can be met through education, prior job experience, internal and external training classes, on-the-job training, TRN training modules, procedure reading, or any combination thereof, to enable the person to perform assigned job functions and meet regulatory compliance.

Each analyst training to perform a new analysis is required to perform an initial demonstration of capability and meet the requirements for accuracy and precision before working independently on the test method. Typically, this is accomplished by the successful analysis of four known samples. However, there are certain tests performed that are not required by the mandated test method or regulation to perform the above procedure (i.e., EPA 1010, 9095). In this case, the analyst's documentation of proficiency is satisfied by the sign-off of having read, understood, and agreed to follow the SOP as written, on-the-job training and observation by a senior analyst.

Management personnel are responsible for planning ongoing professional growth and development activities for an employee through on-the–job training and/or internal and external training courses so an employee can maintain a current skill set to match job responsibilities.

An annual performance review based on job accountabilities, objective measures, and pre-defined standards is completed by management personnel for each employee. This assessment is documented and maintained. Input is obtained from other managerial personnel as needed.

2.11.1. New Hire Training

New employees are oriented as part of a year-long process that is designed to make the employee feel welcome and comfortable by defining our culture, traditions, philosophies, and work practices. During the orientation process an employee learns about personnel and safety policies and business strategies in addition to quality, ethics, and customer satisfaction expectations through a formal process administered by our Human Resources Department.

New employees are required to attend "core" technical orientation, as applicable, which can entail the participation in training module exercises, short session attendance, and/or other skill training specific to their assigned department or job function. Additional job-specific training required for an employee is based upon their assigned duties and is identified by their supervisor. Technical orientation occurs during the first few weeks of employment.

Note: Seasonal and temporary employees have reduced "core" training requirements based on the assigned tasks and as defined by QA, Safety, and the assigned department management.

The orientation process is designed to enable employees to initiate and take responsibility for their personal and professional career growth at the laboratory. The orientation process is conducted without regard to employee race, color, creed, national origin, sex, age, or disability in accordance with the laboratory's Employee Equal Opportunity (EEO) policy.

2.11.2. Ongoing Training

Refresher and ongoing training occurs through various means, which include but are not limited to, training in or independently review new/updated standard operating procedures and TRN training procedures; on-going regulatory training; in-house or off-site classes or seminars. The goal of this training is to ensure that employees remain current with changes to laboratory systems and practices, as applicable to their job function. Retraining and re-qualification activities occur as directed by procedures or regulations. Employees are retrained if an issue or investigation warrants that retraining is a necessary corrective action. Management directs when employee re-training is required, and the extent of the re-training.

2.12. Regulatory Training

The QA Department is responsible for coordinating and conducting initial and ongoing regulatory training (i.e., GLP) for all applicable laboratory and support personnel. It is the responsibility of management within each department to ensure that personnel attend the required training sessions.

The choice of training format and topics covered for ongoing regulatory training is left to the discretion of QA and the trainer. All training sessions reinforce the concepts in the regulations as they are relevant to the laboratory.

Whenever possible, after training is completed, a demonstration of proficiency of the training topic is given. The demonstration of proficiency is generally in the form of a quiz although other demonstrations of proficiency are acceptable depending on the scope and content of the training. If necessary, training is presented and/or repeated one-on-one with individuals who do not demonstrate proficiency in the training topic. This is performed by QA in conjunction with applicable laboratory management personnel.

2.13. Employee Safety

The laboratory, being mindful of its responsibilities as an employer and active corporate citizen, has established the following objectives of its safety program:

- Provide a safe environment for its employees, visitors, and the community surrounding its place of business.
- Provide ongoing safety training for employees.
- Provide all necessary facilities and equipment to ensure the safety of its employees and to minimize all chemical exposure during the normal performance of their required tasks, and to take all necessary precautions to safeguard the surrounding environment.
- Provide periodic health physicals for employees.
- Foster and encourage safe operations and a proper safety attitude on the part of our employees through general operations and systems, training, and the *Chemical Hygiene Plan* (CHP).

The CHP addresses various aspects of our safety program in greater detail.

A Safety Committee works to enhance our overall safety program. The committee meets on a routine and ongoing basis and its specific responsibilities are detailed below:

- Review accident and incident reports. Make recommendations for methods of prevention to eliminate further accidents.
- Promote safety awareness and distribute safety information by various means (e.g., posters, videotapes, pamphlets, and books). Use internal communication channels to promote safety awareness.
- Enhance and recommend safety-training programs for all employees, as necessary.
- Maintain up-to-date information on employee concerns that are safety related. Offer input and information to the Chemical Hygiene Officer and/or Safety Officer, as needed.

2.14. Client Services/Project Management Responsibilities

Members of the laboratory Client Services/Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager (a.k.a. "CSR") who serves as their primary contact at the laboratory. It is the project manager's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements. All client verbal communications are documented by the project manager in a controlled notebook. In addition to information management, Project Management responsibilities include:

- Coordinating and preparing proposals in conjunction with technical staff.
- Confirming certification status.
- Hosting client visits and audits.
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution.
- Providing clients with sample status report or results (partial reports) prior to receipt of the final Analysis Reports (e.g., fax, e-mail, phone).
- Scheduling sample submissions, sample containers, and sample pick-up via the laboratory courier service.
- Informing the client of deviation from their contract.

2.15. Confidentiality

Strict confidentiality is maintained in all of our dealings with clients. Confidentiality agreements, therefore, are willingly provided.

All employees are required to protect company technical data, including client names and test results from disclosure to any third party. This policy, as described in the *Eurofins Lancaster Laboratories Employee Handbook*, is provided and presented to employees during their orientation period and whenever revisions are made.

Intellectual property associated with the testing that we perform under contract for a client is the property of the client.

In an attempt to ensure the confidentiality of our systems and procedures within our laboratory, it is our policy to restrict the distribution of our internal procedures to clients. Clients are permitted to review our procedures while on-site as part of an audit or visit. Based on this policy, we would request that any documents viewed would not be shared or made available to any third parties without the permission of the laboratory.

2.16. Business Conduct

Our business conduct policy applies to all operations of the company. All employees must avoid involvement in any activities that would diminish confidence in their competence, impartiality, judgment, or operational integrity. All employees must further avoid any relationship with other individuals or organizations that might impair, or even appear to impair, the proper performance of their company-related responsibilities. Employees must avoid any situation that might affect their independence of judgment with respect to any business dealings between the company and any other organization or individual. Any employee who believes that they have such a conflict, whether actual or potential, or who is aware of any conflict involving any other employee must report all pertinent details to the Vice-President or President of the company. The company's management vigorously enforces this policy and takes prompt and appropriate action, including termination, against any employee found to be in violation.

2.17. Operational Integrity

All employees review and sign the Employee Ethics Statement on their first day of employment and annually thereafter. Employees responsible for generating, handling, or reviewing laboratory data understand that the laboratory mission is to perform all work with the highest level of integrity. Under no circumstances are shortcuts or generating results to suit a client's purpose rather than good scientific practice considered acceptable. Any violation of the laboratory ethics policy results in a detailed investigation that could lead to termination.

All levels of management consider the following activities unacceptable:

- Knowingly recording inaccurate data.
- Fabrication of data without performing the work needed to generate the information. This includes creating any type of fictitious data or documentation.
- Time travel or adjusting clocks on computerized systems to make it appear that data was acquired at some time other than the actual time.
- Manipulation of data for the express purpose of passing system suitability or quality control criteria.
- Selective use of data generated, or not using data that was legitimately generated and has an impact on the outcome of the test.
- Executing significant deviations from approved test methods and procedures without prior approval from the laboratory management and/or the client.

If an issue does arise which could compromise data integrity, personnel are instructed to perform the following activities:

- Clearly document the situation and maintain all data generated. There is a big difference between poor judgment and fraud. Fraud usually involves intent to conceal an action taken. Therefore, the more documentation that is maintained, the less likely an action is considered fraudulent if further scrutinized.
- When out-of-specification results or quality type issues are detected, all supporting data and relative background information must be documented and presented for management review. Problem resolution and client contact, as applicable, must also be documented.
- Review any questionable situations and decisions with a supervisor.

- Bring a questionable or uncomfortable issue directly to the QA Director or a member of the QA Department as part of our QA open door policy.
- Utilize the company's anonymous Ethics hotline service. See Section 12.4 of this manual.

3. BUILDINGS AND FACILITIES

3.1. Facility

The laboratory is located at 2425 New Holland Pike, Lancaster PA. The facility consists of two campuses with multiple buildings located on the North and South sides of Route 23. The two campuses are connected by a pedestrian bridge that spans Route 23.

Building A resides on a commercial plot measuring 13.6 acres on the north side of Route 23. Building A is a three-story building of concrete and steel construction which houses both laboratory space and administrative offices. It is approximately 108,000 square feet and consists of approximately 47,000 square feet of laboratory space; 29,000 square feet of office space; and 32,000 square feet of storage, mechanical, and common areas. On this parcel, adjacent to Building A, sit two chemical storage buildings (Buildings I and L) with a total space of 2500 square feet. In addition, a 10,500 square foot storage building houses stability chambers (Building J). The bottles packing area, which includes preservation of bottles being sent to clients for sampling, is located in a separate 3100 square foot building (Building K). In addition, there are two other buildings (Buildings G and H) with a total square footage of 20,000 square feet that host recycling, storage, workshop and facilities maintenance areas.

The remaining buildings reside on a commercial plot measuring 35.7 acres on the south side of Route 23. These building are connected to the north campus buildings via a pedestrian walkway over the highway.

Building B is a three-story building of steel and concrete construction. It is approximately 56,000 square feet and consists of approximately 17,000 square feet of laboratory space; 14,000 square feet of office space; and 25,000 square feet of storage, mechanical, and common areas.

Building C resides between buildings B and D and consists of a three-story building of steel and concrete construction. It is approximately 47,000 square feet and consists of approximately 25,000 square feet of laboratory space; 6,900 square feet of office space; and 15,100 square feet of storage, mechanical, and common areas. The first floor houses the main lobby and visitor's entrance.

Building D is connected to building C. It is a 78,000 square foot, four-story building of steel and concrete construction and provides approximately 35,000 square feet of laboratory space, 19,000 square feet of office space, and 24,000 square feet of storage, mechanical, common area.

Two small support buildings (Buildings E and F) with a combined space of approximately 800 square feet are used for chemical and waste storage on the south campus.

The Lancaster campus also utilized an adjacent parcel for a technical training center. This space is approximately 6,500 square feet.

There is an automatic fire alarm and security system hooked up at the facility. This system is monitored offsite by Choice Security. The entire campus and all exterior doors are monitored by video surveillance.

This facility is serviced by public sewer. Drinking water comes from a private well while the facility sprinkler system is fed by the public water supply. The closest surface water is the Conestoga Creek.

3.2. Security

The laboratory is considered a secure facility. All outside doors except the main lobby entrance are locked during normal business hours to prevent unauthorized entry. An attendant monitors this entrance at all times.

During evenings, weekends, and holidays, all doors are locked and Security personnel are on site to prevent unauthorized entry into the building. Video cameras are utilized by Security personnel to monitor the facility grounds.

Every employee is issued a photo ID badge which also serves as a building access card. This badge must be worn at all times while on laboratory property so that employees are easily identified. Access to secured/designated areas within the building is limited to only applicable employees through the building security system. This system is administered by Security staff.

All visitors must register with the lobby attendant and are issued a visitor badge. A staff person must accompany visitors while in the facility. Additional visitor rules are outlined in the *Visitor Security and Safety Rules* pamphlet which is provided to all guests.

Building access cards are issued on a temporary basis to contractors or service technicians (e.g., electricians and plumbers) who need access to the building to work on a project. These cards provide the contractor with limited access during the normal workday and must be returned when the work is complete.

3.3. Disaster Recovery

A disaster recovery plan is in place to provide direction for situations where normal operations of the laboratory are not possible. In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Physical Services, Maintenance, Safety, Corporate Management, Public Relations, IT, QA and other applicable personnel depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

The plan addresses, in general terms, how to approach the following issues: electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, and stability chamber failures.

3.4. Environmental Monitoring

The air handling system for the main laboratory is specially designed to protect sensitive instruments from harmful vapors to ensure that samples are not contaminated. The Physical Services/Maintenance Group is responsible for maintaining the HVAC and exhaust hood systems. This is particularly important in our instrumentation rooms and computer center where a controlled environment, positive pressure system is maintained.

Most refrigerators, freezers, incubators, and ovens used for analysis are monitored by a computerized system equipped with stationary thermometer temperature probes linked to a master panel that is accessed through a computer. If a unit is outside of a predefined temperature range for a specified period of time, the system alarms. Units not on the computerized system must be monitored manually by recording thermometer temperature readings twice daily.

The laboratory is set up so that there is effective separation between neighboring areas in which there is potential for contamination. Laboratory storage blanks are also used to evaluate conditions under which samples for volatile analysis are stored to monitor for cross-contamination potential. QA provides oversight of the environmental monitoring system.

QA and technical management, in consultation with facilities management as needed, evaluate any issues with environmental conditions that could have adverse effects on data to determine if alternative operational plans (moving testing to alternate laboratories, temporary shutdowns, etc.) need to be employed.

3.5. Water Systems

Well water and the public sewer system service the facility. The water system is monitored to meet the permit requirements of the Pennsylvania Department of Environmental Protection.

Reagent water is available to analysts for sample preparation (including dilution) and glassware cleaning. Two reverse-osmosis deionized water systems deliver highly purified water to a sealed fiberglass storage tank. From the storage tank the water is delivered to an ion-exchange-carbon filter system for further polishing. The water is also exposed to an in-line ultraviolet sterilization lamp before being circulated to taps throughout the laboratory.

Daily monitoring and preventive maintenance for the system is the responsibility of the Physical Services Department. Monthly and annual testing is performed as required by regulatory guidance. QA provides oversight of the water system monitoring. In addition, method blanks are tested with each batch (≤20) of samples.

3.6. Housekeeping/Cleaning

The laboratory is dedicated to providing a clean workplace. A third party professional cleaning service provides routine cleaning of “common areas” that include lavatories, drinking fountains, floors, and windows. Technical staff are responsible for the cleaning (or the contract of cleaning) of specific laboratory work areas.

Detergents used for cleaning contain no to very low levels of metals, pesticides/herbicides/ fungicides, or volatile solvents.

3.7. Insect & Rodent Control

Steps are taken to prevent, monitor, and control insect and rodent infestation. The coordination of this program is the responsibility of the Physical Services Department under the direction of QA. An outside service firm is contracted to perform routine and ongoing monitoring of the facility to ensure that preventive measures which are in place are effective and are working as intended.

No insect or rodent control chemical agents in a liquid or vapor form are applied or sprayed in any laboratory building, unless there is no other option, in which case department management must be contacted for approval.

3.8. Emergency Power Supply

The laboratory is located at the junction of two power grids that supply electrical service to the facility. If one of the power grids fails, we have the ability to work with the power company to have service switched to the other grid. Various types of diesel and natural gas generators are also available on a standby basis to supply power to selected areas of the laboratory in case of a power outage.

To reduce spikes and spurious line voltage changes to laboratory instruments that can affect results or damage electronic equipment, "conditional power" is fed to these sensitive instruments. All essential computer systems are on uninterrupted power supply (UPS) which is a battery system that provides continuous conditional power for a limited time period in the event of a short power outage.

3.9. Facility Changes

Procedures are in place to manage change, ensure communication, and to minimize negative consequences through active participation of personnel involved in a facility change. The goal is to ensure that physical and environmental condition changes are adequately evaluated for impact and reduction of risk to quality, safety, health, employee, environment, property, analytical services, and business operations before and after the change is implemented.

4. DOCUMENT CONTROL

The administration of the document control system including tracking, filing, updating, and archiving of historical copies is the responsibility of the Office Services (OS) Department.

It is our policy to restrict the distribution of our internal procedures to clients and we discourage the distribution of company confidential documents outside of the facility. Clients are permitted to review our procedures while on-site as part of an audit or visit. Any documents that are distributed are only sent with the approval of QA.

The goals of the document control process are:

- Format documents according to consistent and defined standards
- Review and approve new documents
- Schedule review of existing documents
- Control of document versions and effective dates
- Review and approval of document changes
- Control document distribution and removal of obsolete documents
- Archive and protect obsolete documents

4.1. Hierarchy of Internal Operating Procedures

The hierarchy of controlled procedures at the laboratory is defined. These procedures and documentation are made available to promote consistency throughout the organization and to meet regulatory requirements. A list of relevant methods and procedures is located in Appendix E. The development of new procedures and the updating and reclassification of current procedures is an ongoing project.

4.1.1. Level 1 – *Quality Policy Manual* and Company Policies

The intent of these documents is to define "what" we do with emphasis on Executive and Management's responsibility for quality.

The purpose of the *Quality Policy Manual* is to provide a framework to outline the quality systems at the laboratory. Organizational charts, list of SOPs, a list of equipment, instrumentation, and personnel resumes are included as attachments to this manual.

- Executive Management is responsible for ensuring that adequate personnel, resources, and support are available to carry out the requirements of this *Quality Policy Manual*.
- Management is responsible for ensuring that SOPs or other appropriate documents are written and available to personnel to define the practices and systems which support these policies.
- All employees are responsible for conducting business in a manner which is compliant with quality and company policies and associated SOPs or other appropriate documents. Review of these policies and procedures must be documented.

Additional company policies are written to support and expand upon this *Quality Policy Manual*. These policies contain more detailed information about a subject with approval signatures executed at the Executive and/or Management level.

4.1.2. Level 2 – Standard Operating Procedures

The intent of these standard operating procedures is to define "who, what, where, and when." These procedures provide specific information for a process or topic so that the requirements outlined in this *Quality Policy Manual* and company policies can be achieved. The review and approval of these SOPs is performed at the director/manager/group leader level, including QA review and signoff, and the responsibility of these SOPs lies with the area or person directing the operation.

SOPs can apply to site-wide operations, the entire company, across multiple departments, or a specific operating area.

4.1.3. Level 3 – Work Instructions (at a departmental level)

The intent of these procedures or documents is to define in greater detail the specific "how to". The level of detail in these documents must be sufficient so any appropriately trained person can perform the task accurately. Examples include, but are not limited to standard operating procedures (SOPs); maintenance and calibration procedures; and the laboratory analytical methods. Departmental level procedures/documents are reviewed and approved at the manager or group leader level including QA review and signoff.

4.1.4. Level 4 – Quality Records

The intent of these documents is to provide documented evidence to support our quality systems and operations. Examples include but are not limited to, data notebooks/logbooks, and preformatted data recording forms.

4.2. Document Approval, Issue, Control, and Maintenance

The document control process ensures that documents are approved and adequate for use. It ensures that documents are readily available to personnel and at locations where essential operations are performed.

Procedures are available in electronic form on the company's intranet site through our document management system. The Document Control Group maintains this system in a current and accurate state. These procedures can be printed from this system for reference by employees as the corresponding task is being performed. Prior to using a printed document, the employee must ensure that it is the current version.

Each procedure is uniquely identified and includes effective date, revision identification, and page numbering (total number of pages). All documents are searchable and uniquely identified in the document management system.

Controlled policies, procedures, and work instructions are reviewed and approved by appropriate individuals and are formally issued and administered through the Office Services Group. The review and approval signatures are applied as electronic signatures through the document control interface. Application of the signature is through secure log-in and password and can only be applied by those designated for the review or approval of the individual document.

Word versions of each procedure can be accessed within the document management system by designated personnel within the Document Control group. A PDF copy is maintained on a separate limited access server as a back up to the system.

Procedures undergo scheduled periodic review to ensure that they are accurate, current, and compliant. The frequency of review is either annual or biennial, depending on the procedure. QA is the final signature on procedures which gives QA the authority to implement the procedure; the exception is the Quality Assurance procedures for which the Vice President or his designee is the final signature. Upon the effective date of new or updated documents, all copies of obsolete documents are removed from service. The original historical copy of each outdated/obsolete procedure is clearly identified as a historical version and maintained in a permanent archive file separate from any current versions. (Note: OH EPA is required to review all revised documents applicable to its certification prior to the document being made effective).

Interim amendments to procedures are not allowed. Any needed changes require a revision to the document.

4.3. Client-Supplied Methods and Documentation

Client documentation to support environmental testing at the laboratory is maintained in a centralized area. This information is organized by client/project in the Client Services/Project Management Group. Client documentation includes the following information depending on project size and scope:

- Client supplied analyte lists
- Client supplied project plans
- Client contract quality manuals with specified limits, QC criteria, etc.
- Communication/correspondence records which relate to testing requirements, interpretation of results, or reporting formats

4.4. Laboratory Notebooks, Logbooks, and Forms

Procedures are in place to ensure that all data is traceable, authentic, complete, and retrievable. The following general requirements outline our system for the issuing, control, and archival of laboratory notebook and logbooks.

- The administration of notebooks and logbooks is controlled by the Office Services Group. They maintain a master index to uniquely number and identify each book distributed.
- Notebooks and logbooks can contain blank or preformatted pages.
- Notebooks and logbooks are bound, uniquely identified and have sequentially pre-numbered pages.
- If notebooks or logbooks contain preprinted laboratory form pages:
  - A unique identification number is assigned to each form
  - Forms are approved by appropriate management personnel before they are put into use
  - Forms are reviewed on a routine basis to ensure they are still accurate and current
- Completed notebooks are returned to an archivist. Incomplete books are returned to Document Control:
  - Two years from the issue date
  - for employee specific notebooks – when the employee leaves the company
  - for project specific notebooks – when the project for which it was used is complete
- In specific situations, records are bound to create books at the time of archival (e.g., temperature charts).
- At the time of archival any page(s) in the notebook or logbook that does not contain data documentation is crossed-out or a statement is written on the last page used to note that the book is complete to prevent data from being entered at a later date.
- Notebooks and logbooks identified as requiring permanent archival are assigned a designated qualifier.

4.5. Control of External Documents

Hard copy versions of external documents are controlled through the form system.

External documents such as copies of the 40 CFR and ASTM methods are stored exclusively in the QA Department. QA also keeps applicable agency documents on file, these include, but are not limited to, the TNI (The NELAC Institute) and ISO 17025 standards.

Environmental methods from the EPA or Standard Methods are available in the QA Department, but the technical areas also have copies that pertain to the tests that they perform. Any external document that is maintained in these areas must be inventoried and listed on a controlled form. Some methods are available on-line and are accessed through the Internet.

It is the laboratory's understanding that the need to control external documents is to ensure that the most current version of a method is referenced or appropriate manual is being used. Regulatory methods are used as references by the laboratory and testing is performed as per written SOPs that fall under our existing document control system and have scheduled reviews. The scheduled review of SOPs is used to ensure that the proper version of a method is referenced. While using the most current version of an analytical method is our typical practice, there are specific client needs and accreditation rules that require previous versions of a method to be used.

The technical areas are responsible for ensuring that all manufacturers' manuals are current and available to analysts. The vendor provides instrument manuals when new equipment is purchased or existing instruments are updated. These manuals are kept with the instruments to which they are associated.

5. SAMPLE HANDLING

5.1. Sample Collection

It is the responsibility of the client to send us representative and/or homogeneous and properly preserved samples of the system from which they are drawn. The laboratory assumes that all multiple sample containers with the same designator/description and bottle type contain a homogeneous, representative sample. We also assume that it is acceptable to deplete one container and move to the next, without implications unless otherwise indicated by the client.

The laboratory provides the appropriate sample containers, required preservative, chain-of-custody (COC) forms, shipping containers, labels, and custody seals. The laboratory also provides trip blanks and analyte-free water for field blanks. Preparation of methanol containers for field preservation of volatile soil samples is available.

Sample containers are purchased pre-cleaned by the supplier. For pre-preserved bottles, each lot of preservative is checked for contaminants before use. This also serves as a check on the associated containers. An annual bottle lot check is performed to evaluate the cleanliness of any containers not already covered by the preservative checks. The evaluation is to assess cleanliness to the laboratories' detection limits. These checks are processed through the LIMS as samples. Results are documented through the LIMS Analysis Report.

The laboratory provides instructions with all bottle orders that define how to sample, preserve, store, and ship the samples prior to their delivery at the laboratory. These instructions inform the client of the importance of proper sampling and advise them that non-compliant samples are rejected or reported with a qualifier.

If samples are collected by the laboratory personnel, applicable sampling methods are in place to perform the sampling operation.

As samples are analyzed at the laboratory, there are times when additional sample volume is necessary to complete testing or perform retesting. If this situation arises, "additional sample" is requested by the laboratory and/or submitted by a client to supplement current work being performed within our facility. Additional sample received is either assigned a new laboratory sample ID number and/or a comment noted on the final report to state that additional sample was received, depending on the situation. It is our goal to provide accurate traceability between sample submission and when testing is performed.

5.2. Sample Receipt and Entry

5.2.1. Sample Receipt

Samples can be received at the laboratory 24 hours a day, 7 days a week, 365 days of the year. Receipt can occur in one of three ways:

- The laboratory courier services (i.e., Transportation Department)
- Personal delivery
- Commercial courier

All samples received for testing are delivered to the Sample Administration Department immediately upon arrival. This group is responsible for the unpacking and organizing of the samples. This process includes checking custody seals if present, paperwork agreement, signing the chain of custody, recording cooler temperatures, documenting the condition of containers, accounting for all sample bottles, and observing any safety hazards, and reporting any problems to Client Services for communication to the client. This receipt process is documented in the LIMS.

5.2.2. Sample Entry

As soon as practical after sample receipt, all samples are entered into our LIMS. Samples awaiting log-in are stored in temporary holding areas, at appropriate storage conditions to maintain sample integrity. Samples scheduled for Volatile analysis are stored separately. If there is doubt about the suitability of items received or if items do not conform to the description provided or the testing required is not clear or specified, the client is contacted and the conversation documented.

At the time of entry, the LIMS assigns a unique laboratory sample number to each sample. This number is sequentially assigned and a label is generated and is attached to the sample container.

Samples are tracked to the minute upon arrival. This allows the client to see exactly how long it took the samples to pass through receipt, unpacking, and entry.

A sample acknowledgement is generated from the LIMS per sample entry group. Upon request, a copy of the Acknowledgement may be sent to the client on the day following sample log-in to confirm sample receipt and entry. Internally, appropriate personnel audit all applicable sample entry and client paperwork.

5.2.3. Sample Preservation Check

Support personnel check and document preservation of non-volatile liquid samples after the samples have been entered into the LIMS and before they are placed into storage. Any checks of volatile samples are performed and documented at the time of analysis.

5.2.4. Sample Rejection Policy

Any time a sample is received in a condition that does not meet the method, regulatory, or client requirements, the condition of the sample is clearly documented through the LIMS on a sample administration documentation log or sample problem form. This information is forwarded to the CSR and the client is contacted to discuss the best course of action. The client is given the option to resample or have the sample analyzed and reported with a comment.

5.3. Sample Identification and Tracking

A sample label is generated for each sample and, in addition to the assigned unique sample number, the following information is displayed on the label: client name, sample identification assigned by the client, sample collection information, bottle code ID, analyses requested, and any applicable notes to laboratory personnel. The label includes a barcode that is used to track this information about the sample/container and to trace each container's storage location.

To ensure accountability of results, the unique sample number assigned is used to identify the sample in all laboratory data documentation, including notebooks, instrument printouts, and final reports. The sample number is also used to identify additional containers of the sample that are created during sample preparation and analysis (e.g., subsamples, extracts, digests). Each container for a sample is tracked through the bottle code and an A.B.C… designator when there are multiple containers of the same type received. The link of the bottle code and sample number is used to identify which specific container was used for testing.

Routine sample tracking is documented using the Laboratory Sample Analysis Record (LSAR) which captures the date, time and analyst for each sample preparation and analysis. The information is compiled in the LIMS using electronic record tracking from the data upload and entry functions. This displays, per sample, on each Analysis Report.

5.4. Sample Storage

After sample entry, samples are placed in an assigned and identified storage location until needed for analysis. Room temperature, refrigerated, and frozen storage are available and samples are stored in accordance with regulatory, method, or client direction. The LIMS is used to assign storage locations, which assists in the orderly storage of samples. Sample storage locations are secured and monitored for accurate temperature control. Samples are stored separately from standards and reagents.

The central locked storage facility contains 3430 square feet of refrigerated space, including 2740 square feet equipped for automated sample retrieval. Samples are stored in the laboratory's automated storage and retrieval system (ASRS) or other assigned storage locations (separate volatiles areas) within the laboratory until completion of all analytical work.

When a sample is scheduled for analysis, the analyst requisitions it through the LIMS from the storage area. Barcode readers are used for LIMS documentation of the movement of the samples between storage and the laboratories. To maintain the integrity and security of the sample(s), the aliquot needed for analysis is removed and the sample(s) returned to storage as soon as possible

5.5. Sample Return/Disposal

Samples remain in the storage area following analysis until the testing results have been verified and the analysis report has been generated. On a regular basis, a list is generated from the LIMS that summarizes samples that can be removed from the storage area. At a minimum, water samples are held for 1 week and soil samples for 2 weeks after reporting before they would be eligible for disposal. Samples are either returned to the client or disposed of in accordance with local, state, and federal regulations. Removal of the containers from storage for permanent discard is also documented in the LIMS using the barcode reader.

Due to the variety of waste generated at the laboratory, several general categories of wastes and waste streams have been identified. Identification of waste occurs through information provided by the client, historical information, and/or analytical testing. The laboratory uses a sophisticated, computerized LIMS, which includes programming to assist in the identification of hazardous wastes at time of discard.

For reasons of environmental liability, client confidentiality, proprietary product formulation protection, etc., wastes generated by the laboratory are disposed of via incineration at EPA licensed facilities. The three exceptions include bulk neutralized acid waste, COD analysis waste, and lab pack waste containing mercury. None of these exceptions involve containers with client information.

5.6. Legal Chain of Custody

Samples being tested for litigation require locked storage and documentation of the time and personnel responsible when the sample was not in storage. This level of documentation is available upon client request and procedures to define these activities are in place and include the following:

- A chain-of-custody document is initiated for each bottle type submitted by the client.
- The chain of custody is signed each time the sample is stored, removed from storage, or changes hands.
- Clients requesting internal chain-of-custody documentation receive the completed forms after the analysis is complete.

5.7. Representativeness of Samples

Each analytical method provides specific procedures for ensuring that a representative aliquot of the sample is used for testing. These procedures include shaking water samples and mixing solid samples prior to removing an aliquot for testing. Analysts are also instructed in sampling techniques that prevent contamination of samples.

6. TECHNICAL REQUIREMENTS – TRACEABILITY OF MEASUREMENTS

6.1. Reagents and Solvents

The reliability of our analytical results can be directly affected by the quality of reagents used in the laboratory. Procedures are in place to address labeling, storage, and evaluation of these materials. Reagents and solvents include acids, bases, indicators, buffer solutions, colorimetric solutions (CS), test solutions (TS), and volumetric solutions (VS). The *Chemical Hygiene Plan* provides safety information in regard to the storage and handling of laboratory chemicals. All reagents are stored separately from samples.

Each analytical method includes a list of reagents needed to perform the test. Reagents/solvents are fully described, including chemical name, purity, and description of preparation. Where applicable, shelf life and storage conditions are also listed. The laboratory is responsible for checking that new supplies meet the method requirements. These checks are documented and maintained.

Departmental management ensures that an adequate inventory of reagents needed to perform testing is maintained. Reagents received at the laboratory funnel through the Shipping and Receiving Department and deliveries are verified and labeled with the date of receipt. Large volume reagents (e.g., solvents, acids) are stored in a building outside of the laboratory until needed for use.

In addition to the name and concentration of the reagent, all reagents are labeled with the manufacturer/vendor, storage conditions, the date opened, and an expiration or re-evaluation date. Before using any reagent, the analyst must ensure that the material was properly stored and labeled. If a reagent has passed its expiration date or shows signs of deterioration, the material is not to be used in the laboratory and must be discarded or segregated as expired. In some method development or research work, expired reagents may be used. These must be labeled as such or stored in a designated location.

If a re-evaluation date is reached before a reagent is completely consumed, the reagent will be inspected by physical observation for signs of degradation. Physical signs include, but are not limited to, color changes, clumping or other texture changes for solids and formation of precipitate in solutions. This evaluation is performed by an experienced chemist or microbiologist.

Subsequent reagent solutions or mixtures prepared at the laboratory are fully documented in a logbook and labeled to include: unique name, concentration, date prepared, name of analyst who prepared the reagent, storage conditions or reference to the logbook containing these details, and expiration/re-evaluation date. The information recorded allows these solutions to be traced to the original stock solution. The reference to the logbook is intended for use on containers that are too small to clearly document all of the information.

All reagent certificates and MSDSs are retained by the laboratory.

6.2. Media

Within the microbiology laboratory, procedures are in place to address preparation, labeling, storage, expiration, documentation, and quality/sterility evaluation requirements for these materials. These procedures are described in Appendix K.

6.3. Calibration Standards

Written calibration procedures are required, where applicable, for all instruments and equipment used in the laboratory. The source and accuracy of standards used for calibration purposes are integral to obtaining quality data. Requirements for calibration are provided in each analytical method including specifications for the standards used. Where available and practicable, calibration measurements made by the laboratory must be traceable to national standards of measurement (e.g., NIST). Certificates of Analysis (C of As) are maintained for each material, as applicable.

The laboratory's ISO 17025 and DoD accreditations require calibration materials to be certified and purchased from a reference material producer accredited to ISO Guide 34 and ISO 17025, when available. A list of accredited suppliers is maintained by QA. This is applicable to the tests under these scopes of accreditation and can be met through the stock standards used for calibration; a standard processed under the calibration such as an ICV or LCS; or comparison to a separate reference material at a frequency defined by at the test level (i.e. annually).

Standards are usually purchased from commercial supply houses either as neat compounds or as solutions with certified concentrations. Upon receipt at the laboratory, the material must be labeled with the date of receipt. The accuracy and quality of these purchased standards is documented on a C of A and these certificates are maintained on file in the laboratory. .

Most solutions and all neat materials require subsequent dilution to an appropriate working range. Records of all standard preparations include the dilution(s) made and a reference to the original and any intermediate mixtures. Solutions are labeled according to laboratory procedures and assigned unique names or code numbers that provide traceability to the original components.

All standards are stored separately from samples and in conditions as stipulated by the method or vendor (refrigerator, freezer, room temperature, etc.).

Each new preparation of standard is tested for integrity by comparison to standards from another source or previously prepared solutions. Standards are not used for sample analyses in the laboratory past their expiration date. In some method development or research work, expired standards may be used. These must be labeled as such or stored in a designated location.

6.4. Equipment and Instrumentation

The laboratory is equipped with all equipment and instrumentation required for testing the scope of work which it supports. All equipment and instrumentation is maintained in proper working order. A master list of our equipment and instruments is maintained by our accounting department and includes the date received and the condition at receipt (new v. used). Our major equipment and instrumentation capabilities are summarized in Appendix F. In addition, we have numerous other instruments including pH meters along with support equipment such as ovens, incubators, centrifuges, balances, etc.

6.4.1. General Requirements

- Equipment/instrumentation is assigned a unique designation. This unique number or system identification is used to track the equipment or instrument within data documentation.
- A maintenance logbook is established in conjunction with installation and is readily available to document all incidents and/or routine maintenance processes that pertain to the equipment or instrument as they occur. The corrective action taken, the date that the equipment/instrument is returned to service, and performance checks performed is documented.
- All test, measuring, and inspection of laboratory systems, equipment, and instrumentation used at the laboratory is routinely calibrated and maintained in accordance with applicable standard operating procedures.
- A member of the technical group, or designated individual, performs routinely scheduled maintenance and calibration of laboratory equipment and instruments as required by laboratory procedures. These activities are documented.
- If appropriate standards or expertise for calibration or maintenance are not available in-house, the operation is conducted by an outside service firm, with appropriate accreditation. Certificates or other data generated by the service firm are reviewed by applicable the laboratory personnel to verify acceptability. This information is maintained on file.

- All equipment or instruments taken out of service are tagged "DO NOT USE". The following minimum information is documented on the tag:
  - Date taken out of service
  - Employee who took the equipment/instrument out of service
  - Reason for tag-out

6.4.2. Standard Operating Procedures

Information regarding operation, maintenance, and calibration of equipment and instrumentation is found in the respective SOPs. The procedures include, where applicable, a routine schedule for preventive maintenance and calibration along with acceptance criteria and remedial action to be taken in the event of failure. These procedures are maintained in the document control system and reviewed on a regular basis to verify they remain current and accurate. Vendor supplied manuals are also available to provide additional information in regard to operation and maintenance.

6.4.3. Maintenance

- Instrument and equipment maintenance is performed as either a preventive or corrective operation.
- Preventive maintenance procedures and schedules are developed for each instrument or piece of equipment, where applicable. Preventive maintenance operations are performed by an analyst, equipment maintenance specialist, or contracted (manufacturer's representative or service firm personnel). Documentation is maintained in the associated maintenance log for the procedure(s) performed as part of the preventive maintenance operation. It is the responsibility of departmental management to ensure that a preventive maintenance schedule is addressed by a procedure where appropriate and is followed.
- Corrective maintenance is performed by an analyst, equipment maintenance specialist, or contracted (manufacturer's representative or service firm personnel) in response to indications of equipment or instrument malfunctions. The unit must be clearly tagged as out of service. All corrective actions taken to bring the unit back into service are documented in the associated maintenance log. After repair, further notation is made in the log regarding the functional status. Calibration activities are performed, as applicable, and documented in the log before the unit is placed back into service.
- A supply of commonly needed replacement parts is maintained by the laboratory.
- A preventive maintenance schedule for major instruments is given in Appendix G. Maintenance of equipment used in microbiological testing is documented in Appendix K.

6.4.4. Calibration

- Calibration is the establishment of, under specified conditions, the relationship between the values/response indicated by a measuring instrument or system and the corresponding known/certified values associated with the standards used. Some types of calibrations are performed with a set frequency (e.g. daily) while others provide intermediate checks to ensure that the instrument response has not changed significantly.
- All measuring and testing instruments and equipment having an effect on the accuracy, precision, or validity of calibrations and tests are calibrated and/or verified on an on-going and routine basis. Methods for calibration of instruments and equipment vary widely with the nature of the device and the direction given by analytical procedures, departmental procedures, manufacturer recommendations, or regulatory requirements. Frequency of calibration can also depend on additional factors including ruggedness of the instrument or equipment and the frequency of use.
- Departmental management is responsible for developing or acquiring written calibration procedures for the types of instruments and equipment employed within their area, as applicable. Procedures address the following aspects: description of the calibration method, frequency/schedule for calibration, acceptance criteria, and corrective actions if failure occurs.
- Calibration information is recorded in a logbook that is associated with the instrument/equipment and/or a calibration certificate is maintained and/or data is generated and filed to document the activity.
- Calibration measurements are traceable to national standards of measurement (e.g., NIST) where available. Physical standards, such as NIST certified weights or thermometers are re-certified on a routine basis. Calibration certificates are maintained on file, where applicable, to indicate the traceability to national standards of measurement. These physical standards are used for no other purpose than calibration.
- Calibration failures are documented in the associated logbook and/or within the data generated from the instruments or equipment. Management personnel perform an evaluation and review of failures and assess any potential impact the failure might have on previously generated data. The laboratory utilizes “real-time” controls to ensure the accuracy of the data. These controls are used to assist in assessing the impact of the situation.
- After repair, adjustments, or relocation that could affect instrument response, calibration/verification activities are performed, as applicable, before the unit is returned to service.
- Analytical data is not reported from instrumentation or equipment with noncompliant calibration unless the client has agreed to receipt of the data and appropriate comments are applied to the final Analysis Report.
- A summary of the calibrations for most major instruments and equipment is given in Appendix H.
- Procedures for calibration of equipment used in microbiological testing are documented in Appendix K.

6.5. Computerized Systems and Computer Software

6.5.1. Computer Usage

The laboratory provides computer equipment for employees to use as a tool in performing their work. Computer equipment is the property of the laboratory and used in accordance with defined terms and conditions. Our goal is to provide standard hardware and software that meets the needs of the user. The majority of desktop PCs in use are standardized using cloning software.

6.5.1.1. Physical security of computer systems – It is company policy to protect computer hardware, software and data documentation from misuse, theft, unauthorized access and environmental hazards. The corporate computer area and computer "Hot-Site" is locked and requires identification/building card access. All vendors, contractors, or other visitors must be escorted into this area. Controlled access of the laboratory buildings is outlined in Section 3.2.

6.5.1.2. Passwords – Passwords are important for the security of company data and resources. The laboratory's primary network operating system is Windows and each employee must have a user ID and password combination to access the system. Other computer systems also require a user ID password combination for access. The following procedures apply regardless of which system(s) is being utilized:

- Passwords must be created as strong passwords in accordance with Eurofins Password Policy and must be kept confidential.
- Users must log-out of a system when not in use to prevent unauthorized access. In addition, the network access will automatically timeout after a set period of inactivity, requiring a user to log-in to access the system.
- Forgotten passwords can only be reset by the IT Department or by an appropriate System Administrator.
- Network and LIMS passwords automatically expire every 90 days. The computer prompts a user to change the password when the expiration date nears.

6.5.1.3. Computer viruses – The laboratory centrally and continuously monitors the computer network for computer viruses. Employees are prohibited from using the company's computer equipment to propagate any virus. Anti-virus software is employed to detect viruses on the Windows network. A notification is sent when there is a particularly dangerous or virulent data destructive program that employees need to be aware of. However, employees are instructed to always be cautious and observant even if there are no current warnings. Employees must report any virus concerns to the anti-virus administrator or IT Management as soon as possible. Employees who share files between their home computer and the laboratory should install anti-virus software on their home computer. If an employee does not have such software, the laboratory can suggest various no-cost anti-virus software products.

6.5.1.4. Internet and e-mail system – The e-mail system is used primarily for the laboratory's business purposes. The *Eurofins Lancaster Laboratories' Employee Handbook* provides additional information in regard to system usage. Employee access to the internet is restricted to those employees who have a business need for it. All employees have access to e-mail. Access to the internet is configured through a user's Windows network account. All internet and e-mail activity is subject to monitoring. All messages created, sent or received over the internet are company property and can be regarded as public information. E-mail and website filtering software is utilized.

6.5.1.5. The laboratory's Intranet (LabLinks) – The Intranet is designed to be a useful tool for employees to acquire company information and to provide a company communication system. The *Eurofins Lancaster Laboratories' Employee Handbook* provides additional information in regard to usage.

6.5.1.6. Software policy

- Copyright laws protect software, and the laboratory's intent is to abide by all software agreements.
- Software purchases must be formally requested and approved by management and/or validation personnel, as necessary.
- All software is used in accordance with applicable license agreements.
- Employees are not to install any software on computer(s) unless authorized by the IT Department.
- Software upgrades must occur in accordance with applicable change control procedures.
- Employees must not give software to outsiders (e.g., clients, contractors), unless approval is granted by management.
- Users must not make copies of any licensed software or related documentation without permission. Any user that illegally reproduces software is subject to civil and criminal penalties including fines and imprisonment.

6.5.1.7. Computer system backup, data restoration, and data archival – Mission critical data is stored on several computers throughout the laboratory. These computers are connected through the local area network. Selected files on these computers are backed up using an enterprise-level backup software program. The objective of this backup is to have the ability to restore data after a total loss (e.g., theft, fire, natural disaster). Procedures are in place to perform data backups and restores.

6.5.1.8. Remote access to computer systems – Employees are able to remotely connect to the laboratory computer systems through an encrypted (SSL) login. When logging in, users are authenticated with their Windows Active Directory account and password.

6.5.1.9. Electronic data – Instrument software used for processing data must, when available, have password access and audit trails enabled. All data processed through the LIMS includes tracking features to document who and when data was entered and/or changed.

6.5.2. System and Software Verification – The laboratory LIMS is an in-house developed program. The design and updates to the system are written following typical Software Development Life Cycle (SDLC) processes for initial planning through testing and implementation. Before a new computer system/program or significant modification of an existing system/program is implemented in our laboratory, it is necessary to generate a plan to specify the level of documentation required for the new or updated application. Developers, affected area management, and QA personnel review and approve the documentation.

The following are the typical documents that are compiled for these updates:

- System Change Request document – used for documenting/tracking changes in the programming
- Requirements documents – Describe the required system functionality and specifications
- Design documents – System overview, screen design, report layout, data description, system configuration, file structure and module design
- Testing documentation for system development/verification – Structural testing of the internal mechanisms and user testing of the installation and system qualification
- Periodic Review documents – periodic retesting of the programs is performed to ensure that the systems remain in a validated state.
- Retirement documents – used for documenting when a program is taken out of service
- Standard operating procedures and/or manuals

6.6. Change Control

Procedures are in place to define how to maintain facilities, processes, instrumentation, equipment, computerized systems, and computer software in a validated or controlled state through a plan of change control. Successful changes require a thorough evaluation and testing for potential consequences prior to implementation. Planning, authorizing, testing, and reviewing of proposed changes are documented throughout the change process. Changes are planned or could be made in response to an emergency situation. The following “general” elements apply to changes, as appropriate:

- Request to perform a change
- Evaluation of a change
- Authorization of a change request
- Preparation for an authorized change
- Execution and testing of the change
- Documentation of the change
- Approval of the change
- Change implementation and follow-up (Formal approval of the change is performed by designated responsible individuals and QA.)

6.7. Labware Cleaning

Dedicated washroom personnel support the laboratory operations in regard to labware preparation, washing, rinsing, and drying. Labware can include, but is not limited to glassware, plastic ware, utensils, and pipettes. Procedures are in place to outline the washing process for each type of labware. Most labware is cleaned using a Miele glass washing machine. Some labware is still washed by hand and either air-dried or dried in specifically designed ovens.

Most of the labware used in the laboratory is "common or non-dedicated" labware (common to a department), but some of the labware used in the laboratory may be identified as "dedicated" labware and exclusively used for certain analyses. Examples of dedicated labware include glassware used for high resolution mass spectrometer (HRMS) and low level mercury testing. This labware is isolated and cleaned only with "like" labware.

All glassware is class A and 100% visually inspected for breakage (e.g., cracks, chips), cleanliness, and dryness before being returned to the laboratory for use.

Generally, each test has controls in place to ensure that results are not adversely affected by unclean labware. These controls include blanks to detect positive interferences and recovery controls to detect negative interferences.

7. PURCHASING EQUIPMENT AND SUPPLIES

7.1. Procurement

It is the responsibility of management personnel within each department to ensure that the appropriate supplies are available and/or ordered with sufficient lead-time to perform analytical testing or to provide support to the testing areas. The individual technical departments have trained personnel who enter the supply order into the company's requisition software system. The selection of these products is based on technical input at the analyst level and authorized by technical departmental management. The Purchasing Department maintains an ordering system in which purchase requisitions are managed. Common laboratory items (e.g., beakers, flasks, reagents) are ordered directly through the Purchasing Department. Purchase orders over a specified dollar amount require verification from the appropriate member(s) of the Executive Management Group before an order can be placed.

Upon receipt of an order, the Purchasing Department checks the order to ensure that all items were received as specified. Products that have specific storage requirements are taken to the technical area upon receipt. It is the technical area's responsibility to ensure that the product is stored in the appropriate manner. Any checks on the quality of the materials received for use in a specific test are the responsibility of the laboratory using them. This is based upon the experience of the laboratory with the usability of the product. Generally, each test has controls in place to ensure that test results are not adversely affected by the materials.

Any problems encountered when using a material in the laboratory must be brought to the attention of the Purchasing Department and/or Quality Assurance, as applicable, to ensure that follow-up and corrective action occur.

7.2. Supplier Evaluation

Procedures are in place to evaluate vendors who supply us with: new equipment, instrumentation, computerized systems and computer software; commercially purchased glassware, including sample bottleware, reagents, chemicals, solvents, gases, media, and standards; and contracted and subcontracted services.

The laboratory strives to ensure that our suppliers continually improve their quality systems and we reserve the right to purchase from suppliers of our choice in order to best fulfill the needs of our clients and our business. When directed by a client to purchase from a specific supplier, we will do so. In this instance it is the client's responsibility to "qualify" the specified supplier. We attempt to purchase from businesses that we have an established purchase history or have previously acquired information regarding the supplier's quality programs.

The laboratory does not evaluate every supplier. Risk assessment is taken into consideration when making this decision. The risk assessment analysis includes system, material, services, and number of samples or operations the purchase may affect or support. Evaluations are not required for computer operating systems, utilities, toolsets, or systems software. They also are not required for any off-the-shelf configurable software package that has an extensive market performance history (e.g., Microsoft Word, Excel, Access).

Additional quality systems are also in place within the laboratory to further verify and support the materials used:

- C of A for every lot of purchased prepared microbiological media and for purchased chemicals, where available, are reviewed and maintained on file.
- For most chemical analyses a blank and a recovery check are routinely analyzed and serve as real time suitability testing of the reagent being used.
- Microbiological testing often employs positive and negative controls, which serve as real time control checks.

8. ANALYTICAL METHODS

8.1. Scope of Testing

Samples are analyzed in accordance with official published methods, standard methods, client-supplied methodology, or validated in-house methods. We recognize the importance of providing verifiable results and, therefore, use methods accepted and approved by a broad range of federal and state regulatory agencies. In order to meet the needs of our clients as well as regulatory agencies, the laboratory sometimes needs to support different versions of the same method (i.e. SW-846 8081A and 8081B). The laboratory can also assist in developing and validating analytical methods for specific products and matrices. All methods submitted for our review, as well as all analytical results, are considered confidential.

The laboratory performs a wide variety of environmental testing in support of the Safe Drinking Water Act (SDWA); Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA); Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA/Superfund); and the Clean Air Act (CAA). Methods approved by ASTM are also used in testing. Potable water, wastewater, soil, sediment, sludge, oils, biota, tissue, soil gas, and air are among the matrices typically analyzed.

Our areas of expertise include:

Standard Services	Specialty Services
• Volatiles • Semivolatiles • Metals • Pesticides/PCBs/Herbicides • Petroleum Analysis • Waste Characterization • Non-potable Water Testing • Drinking Water • Soil and Surface Water Testing • Vapor and Air Analysis • Sediment and Tissue Testing • Method Development • Shale Oil & Gas Analysis •	• Low-Level Mercury • Dioxins & Furans • Hydrazines and NDMAs • Perchlorate • 1,4-Dioxane • Pharmaceutical Manufacturing Industry (PMI) Wastewater • EPA Method 25D • PCB Congeners • Explosives • Alkyl PAHs, Alkanes, Biomarkers • PFC (PFOA) • Organic Acids • Aldehydes •

A list of tests covered under the laboratory's NELAP accreditation can be found in Appendix I. All current certificates and scopes of accreditation are available on the laboratory's website at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/. A complete list of the tests routinely performed by the laboratory can be found in the *Schedule of Services*.

8.2. Analytical Test Methods

Each laboratory is required to establish and maintain analytical procedures for all the methods referenced in standard testing. The sources for these methods include the most recent versions of these compendia:

- Test Methods for Evaluating Solid Waste, SW-846
- Standard Methods for the Examination of Water and Waste
- Code of Federal Regulations, Chapter 40
- EPA 100 through 600 and 1600 series methods
- ASTM

The test methods used are re-written into a laboratory standard format, which provides consistency in content and allows the analysts to locate the information they need quickly. Procedures are in place to define the format, required approvals, and the control system for these method documents. Elements to address in SOPs are based on TNI and DoD required sections. The format requirements include, but are not limited to, the following:

- Uniquely assigned method number, which is used extensively for scheduling and documentation purposes.
- Reference to the original source of the method (e.g. SW-846)
- Scope
- Basic Principles
- Apparatus and Reagents
- Personnel Training and Qualifications
- Safety and Waste Disposal
- Detailed procedure (including any method modifications)
- Calculations
- QA/Quality Control
- Revision Log
- Approval signatures from technical management and QA personnel

Analytical methods are maintained as controlled documents to ensure that analysts are always working with the most current version and are reviewed periodically for accuracy.

8.3. Client Supplied Methods

Most of the client-supplied method requirements presented to us involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The CSR notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

Occasionally, we are asked to transfer a non-standardized method from a client into our lab or to develop a new method, when one is not available. In the case of a method transfer, we set up the client's method and perform some initial evaluation. After the initial evaluation, we may make recommendations on how to improve method performance. If the method appears to be adequate, we determine linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and quad studies.

In the case of method development, we work with the client and/or data user to determine the level of validation required ensuring that the method meets its intended purpose. In addition to the elements above, we also determine standard and sample stability and robustness depending on the scope of the project. Typically, a standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of field samples. Data related to the setup of the method are archived.

8.4. Method Validation

Before new or revised analytical methods are authorized for routine use in the laboratory, validation data is required to demonstrate that the method as performed in our laboratory and analysts performing it are capable of meeting data quality objectives for precision and accuracy. A procedure is in place to outline this process.

Many methods published by USEPA include instructions for performing an initial demonstration of capability, which typically consist of determining the method detection limit and analyzing fortified samples in quadruplicate. This demonstration is performed and compared to acceptance limits for precision, accuracy, and detection limits, when available.

Methods that do not include specific validation requirements are validated by analyzing fortified samples or standard reference materials in replicate. The results of these analyses are used to assess accuracy and precision. Results of validation studies are documented and subject to review and approval by technical and QA management.

8.5. Procedural Deviations

Analysts are required to follow a documented method for all tests performed. Procedures are in place to ensure that deviations from analytical methods are documented, approved, and justified in an appropriate and consistent manner (Note: Deviation from the OH EPA approved SOPs is not permitted). We classify method deviations as either being a planned deviation or an unplanned deviation. In general, the following information is captured to document both types of situations:

- Description of the deviation
- Reason or justification for the deviation
- Impact the deviation had on the testing
- Signature/date of analyst performing the test
- Signature/date of Quality Assurance and Laboratory Management approving the deviation
- Signature/date of client approval, if necessary

Deviations to written procedures are documented in raw data records or through the ICAR (Investigation and Corrective Action Report) system. Both types of documentation require management and QA review and approval.

9. INTERNAL QUALITY CONTROL CHECKS

9.1. Laboratory Quality Control Samples and Acceptance Criteria

Quality control (QC) samples are analyzed with each batch of samples to demonstrate that all aspects of the analysis are in control within established limits of precision and accuracy. Management is responsible for ensuring that QC is analyzed as required by the referenced method. Each analytical SOP specifies (or cross-references another procedure) the type of QC sample, frequency of analysis, acceptance criteria for QC sample results, and corrective action to be taken if QC sample results fall outside of the acceptable range.

QA staff, at the direction of the technical department, must program the LIMS with the acceptance criteria for each QC type (other than blanks). The acceptance criteria are based on statistically generated limits from historical laboratory data, on method defined limits, government agency recommendations, or on client/project specific limits.

These limits are used to flag samples that are out of specification.

The types of QC samples and the information each provides are discussed in the following paragraphs.

Quality control checks used for microbiological tests can be found in Appendix K.

9.1.1. Blanks - A blank is a designated sample designed to monitor for sample contamination during the analysis process. The blank consists of a clean matrix (i.e. reagent water, Ottawa sand, glass beads, Teflon chips) taken through the entire sample preparation and analysis process. The blank and field samples are treated with the same reagents, internal standards, and surrogate standards. Ideally, blanks demonstrate that no artifacts were introduced during the analysis process. The specific acceptance criteria for each test are usually based on the required reporting limit (MDL or LOQ).

9.1.2. Surrogates - Surrogates are organic compounds, which are chemically similar to the analytes of interest but are not naturally occurring in environmental samples. When required by the analytical method, surrogates are spiked into all the field and QC samples to monitor analytical efficiency by measuring recovery on an individual sample basis. The percent recovery is determined and compared to the acceptance criteria.

9.1.3. Matrix Spikes - A matrix spike sample is created by fortifying a second aliquot of a water or soil sample with some or all of the analytes of interest. Blanks are not used for matrix spike QC. The concentration added is known and compared to the amount recovered to determine percent recovery. Matrix spike recoveries provide information about the potential matrix effects on the data. Matrix effects can cause results to be outside of the acceptance criteria.

9.1.4. Laboratory Control Samples - Laboratory control samples (LCS) are samples of known composition that are analyzed with each batch of samples to demonstrate laboratory accuracy. Laboratory fortified blank (LFB) is another term used to describe a LCS. The samples are clean samples fortified with known concentrations. Percent recovery is calculated and compared to acceptance criteria.

9.1.5. Duplicates and Matrix Spike Duplicates and Laboratory Control Sample Duplicates - A duplicate is a second aliquot of a sample that is treated identically to the original to determine precision of the test. To compare the values for each analyte, the relative percent difference (RPD) is calculated by dividing the difference between the numbers by their average. Precision for analytes that are not typically found in environmental samples (i.e., organic contaminants) is determined by analyzing a pair of matrix spike duplicates, defined as two spiked samples and comparing the RPD for the spiked compounds. The acceptance criteria are described as a maximum for the RPD value.

9.1.6. Internal Standards - Internal standards are organic compounds, which are chemically similar to the analytes of interest but are not naturally occurring in environmental samples. When required by the method, internal standards are added to every field and QC sample after extraction but prior to analysis. Comparison of the peak areas of the internal standards is used for quantitation of target analytes. Internal standard peak area and retention time also provide a check for changes in the instrument response. The acceptance criteria are stipulated in the analytical method.

9.1.7. Serial Dilutions - A serial dilution is the dilution of a sample with sufficiently high concentration by a factor of five to check for the influence of interferents. This QC check is performed for inorganics analyzed by ICP or ICP-MS. When corrected by the dilution factor, the diluted sample result must agree with the original sample within method specified limits.

9.1.8 Interelement Correction Standard – Analyzed to verify interelement and background correction factors. A solution containing both interfering and analyte elements of known concentration is analyzed at the beginning and end of each analytical run or a minimum of twice per 8 hours.

9.1.9. Second Source Check - A second source check is analyzed using either the LCS and/or an Initial Calibration Verification (ICV). The second source is a standard that is made from a solution or neat purchased from a different vendor than that used for the calibration standards. For some custom mixes, the same vendor but a different lot and preparation is used. This ensures that potential problems with a vendor supply would be evident in the analysis. Some tests use the continuing calibration verification standards as a second source from the initial calibration.

9.2. Quality Control Sample Frequency and Corrective Action

Each analytical method defines the frequency for the required QC samples and the corrective action required when a QC result fails to meet the acceptance criteria. A summary is provided in Appendix J.

The QC acceptance criteria are available to analysts in the laboratory. If the method reference requires the use of specific limits then the laboratory uses the published limits that are documented as part of the analytical method. Many methods require that each laboratory determine their own acceptance criteria based on statistical data obtained from performance of the method. In these cases, the limits are available to the analysts and are entered into the LIMS described below. Statistically determined acceptance criteria are subject to change as the laboratory recalculates its control limits. Due to their dynamic nature, acceptance criteria are not included in this manual.

The results of all quality control samples are entered into the LIMS in the same way as the results of client samples. The LIMS compares the individual values with the acceptance limits and identifies quality control sample results that are out of specification. If the results are not within the acceptance criteria, corrective action suitable to the situation must be taken. This includes, but is not limited to, checking calculations, examining other quality control analyzed with the same batch of samples, qualifying results with a comment stating the observed deviation, and reanalysis of the samples in the batch.

Each month, a summary of all QC entries (except blanks and surrogates) is generated from the LIMS. This summary is reviewed by QA staff and evaluated for changes in data that may indicate that an analysis is trending towards an out-of-control situation. The technical department is notified if a trend is observed.

The laboratory allows for marginal exceedances based on the number of analytes in the LCS. The exceedances are carefully monitored so that any systemic problems would be identified and corrective action taken. If the LCS is being reported based on the marginal exceedance allowance, a comment is added to the analytical report. Note: The use of marginal exceedance is not allowed for OH VAP work.

9.3. Quality Control Charts

The LIMS quality control system is used to report QC data to clients, to collect data for assessment of precision and accuracy statistical limits, and to generate control charts. Control charts are accessible to all employees through the LIMS interface. The system charts results from blanks, surrogates, matrix spike/matrix spike duplicates, duplicates, and laboratory control samples/laboratory control samples duplicate. These charts provide a graphical method for monitoring precision and bias over time. They can be used to detect quality problems by observation of patterns. QA staff uses the charts in conjunction with a LIMS generated monthly QC trend report to evaluate potential data trends.

9.4. Measurement Uncertainty

(ISO 17025) “All uncertainty components which are of importance in a given situation shall be taken into account using appropriate methods of analysis” (5.4.6.3). This means the laboratory must determine the uncertainty contribution of all steps in the testing process such as equipment, calibration, standards, reagents, preparation, cleanups, etc. Since, in most methods, the laboratory control sample (LCS) goes through the entire process of preparation to analysis; all factors that would contribute to uncertainty is evident through the LCS results. LCSs are performed with every batch of samples where appropriate for the method. Tests that do not have LCSs (i.e. TCLP; paint filter test), are evaluated on a case-by-case basis by taking into account the uncertainty of each of the steps taken to perform the test.

Measurement Uncertainty reports are generated by each technical department on an annual basis using a LIMS program and submitted to QA. Measurement Uncertainty is calculated as two times the standard deviation of the LCS recoveries for the group and date range of data points selected for all applicable methods. This is reported as a percentage. It is not necessary to apply or report the uncertainty value with sample results. When a client requests the measurement uncertainty it is applied by multiplying the determined analyte concentration by the uncertainty percentage.

10. ASSURING QUALITY OF TEST RESULTS

10.1. Data Management

At a minimum, data management is initiated when the laboratory receives the samples from the client. More often the process begins with client communication of their needs and requirements for a specific project and/or testing. When requested, bottle orders for the client’s sampling efforts are generated through the LIMS by the CSR. The CSRs are responsible for entering the information in the sample set up function of the LIMS. Upon receipt of the samples a unique tracking number for the sample group and the samples within the group is generated based on this information. At this point, the LIMS becomes an integral part of tracking the samples through laboratory operations. The flow of data from the time samples enter the laboratory until the data is reported is summarized in the following table:

Sample and Data Flow

Action	Personnel Involved
Bottle orders generated upon request • Bottles packed and shipped to the client under chain of custody documentation	Client Service Representative Bottles Preparation
Sample received at Lancaster Labs • Unpacked and reconciled against the client paper work or COC • Sample Entry Documentation log completed	Sample Registration
Sample is entered into the LIMS • Lab ID number assigned • Analyses entered • Storage location assigned • Electronic record of sample number • Labels generated • Acknowledgement printed (record of samples received and analyses entered)	Sample Registration
Preservation checks performed Sample stored in assigned location (refrigerator, freezer, etc.) • Electronic record of sample #, bottle code, and location	Sample Registration
Acknowledgment sent to client (when requested)	Sample Registration
Samples requisitioned and removed from storage for analysis • Electronic requisition of sample number by bottle code • Necessary aliquot taken • Remaining sample returned to storage	Sample Registration Technical Personnel
Analysis is performed according to selected analytical method • Raw data recorded • Data Reviewed • Data uploaded to the LIMS from the instrument or manually entered by the analyst* (This is tracked by the unique sample number and batch number.)	Technical Personnel
LIMS performs calculations as programmed according to methods	Data Processing
Designated analyst or supervisor verifies raw data	Technical Personnel
Generation/release of reports (automated through LIMS)	Billing and Reporting Group
Data package deliverables are assembled, reviewed and released to client Electronic copy saved in the LIMS	Data Package Group
Electronic Data Deliverables (EDDs) are generated	EDD Group
Designated Data packages are overchecked by QA prior to release	QA
Hard copy of batch raw data is archived Electronic files are backed up and archived	Technical Personnel, Data Package Personnel, Office Services, IT

*Analyses requiring the analyst’s interpretation may involve manual data reduction before entry into the LIMS.

10.2. Data Documentation

Analytical data generated in the laboratory is collected from the instruments or associated data system or is manually documented in bound notebooks. Analysts review data as it is generated to determine that the instruments/systems are performing within specifications. If any problems are observed during an analytical run or the testing process, corrective action is taken and documented.

Procedures are in place to ensure that all data is traceable, authentic, and complete. Electronic data records are maintained and tracked through the LIMS, requiring authorized, password protected user access. The following general requirements outline our system for notebook, logbook, and documentation recording:

- Observations, data, and calculations are recorded at the time they are made and are identifiable to the specific task.
- Entries must be legible, signed, and dated. The signature may be a wet or electronic signature.
- Errors are corrected in a manner that does not obliterate the original entry, initialed and dated, and coded with an explanatory identifier. Changes to electronic data are tracked through audit trail functions.
- Blank pages or substantial portions of pages which are left blank are crossed-out to eliminate the possibility of data entry at a later date.
- Notebook pages and instrument printouts are signed/dated to indicate second party data review; this may be a wet or electronic signature.
- At periodic intervals a supervisor or data reviewer checks equipment/instrument logbook entries and temperature recordings for completeness, legibility, and conformance to procedures.
- At a minimum, the following information is recorded as part of data documentation:
    - Date of analysis/operation
    - Signature/date of analyst performing test/operation
    - Identification of client sample(s) and material(s) analyzed
    - Materials, reagents, standards used to perform the testing/operation
    - Method used to perform testing/operation (including version number and/or effective date)
    - Equipment/instrumentation used to perform testing/operation
    - Calculations and how they were derived
    - Departures, planned or unplanned, from the analytical method
    - Signature/date of person reviewing data documentation
- For computer generated data, the following information is recorded:
    - Sample(s) analyzed/operations performed
    - Date of analysis/operation
    - Unique instrument identification
    - Name/date of person operating the instrument
    - Name/date of person reviewing data
    - Any manual notations or interpretations made on instrument printouts are signed, dated, and reviewed

10.3. Data Calculations

Most instruments either include or are connected to a data system programmed to perform calculations to reduce the raw data to a reportable form. All calculations are maintained in the instrument manuals and/or as part of the analytical method.

In many cases, the data from the local instrument system are uploaded directly to the LIMS for review and reporting. This direct upload eliminates the need to retype data and an associated source of transcription errors from the analytical scheme.

Some instruments report data that require application of additional factors before the data is in final form. For example, an extract concentration may be reported by the instrumental data system, but additional dilution and preparation factors may be needed before the result represents the concentration of analyte in the sample. Analysts input these additional factors into the LIMS, where final calculations are performed.

Analysts manually enter collected data, such as titration data, into the LIMS, which is programmed to perform calculations for final reporting. Documentation of the programming for each calculation performed by the LIMS is maintained.

10.4. Reporting Limits

It is important to ascertain the limit of quantitation (LOQ) that can be achieved by a given method, particularly when the method is commonly used to determine trace levels of analyte. The Environmental Protection Agency has set forth one method for determining method detection limits (MDLs) from which LOQs can be extrapolated. This process is summarized in a laboratory procedure.

MDLs are verified or determined annually on each instrument and are the basis for the LOQ used in the default reporting format. Because MDLs change each time they are re-evaluated, they are not included in this manual, but are available in each laboratory and available to clients upon request.

The reporting limit used to determine whether a result is significant and reported as detectable is dependent upon agency and client requirements. A variety of formats are available and include use of the MDL, LOQ, method specified limits, and project specific limits. The MDL and LOQ for each analyte are programmed into the LIMS for reporting purposes.

Under the DoD program, the laboratory must establish a Detection Limit (DL) and Limit of Detection (LOD). As defined by the DoD program, the DL is the smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration with 99% confidence. The laboratory determines the DL using the calculated value from the MDL Study. The DL can be derived from pooled MDL values obtained across instruments. The LOD is the smallest amount of a substance that must be present in a sample in order to be detected at the DL with 99% confidence. It is established by spiking a quality system matrix at a concentration of 2-4 times the DL. The LOD must be verified on a quarterly basis or with each batch of samples.

10.5. Data Review

Final review and verification of the data are performed by designated employees using the sample results, quality control information, method criteria and Project Notes entered into the LIMS. Data are initially evaluated by the analyst and then a second designated employee knowledgeable in the test, other than the employee responsible for performing the test, reviews the data. The reviews include checks for correct transcription, calculations, passing calibrations, compliant quality control results, holding time compliance, and project specific requirements. Any issues or errors identified during this stage are addressed, corrected, and reviewed with the responsible person.

After determining that all necessary requirements for valid data and for the project are met, the reviewer electronically approves the data by changing the LIMS status of the data from “complete” to “verified”. The LIMS is programmed with a list of approved reviewers for each test, and the system is password protected to ensure that only qualified individuals verify the data.

10.6. Data Qualification

Data qualifiers are used to provide additional information about the results reported. The most typical use for data qualifiers is for results that fall below the quantitation limit, in the region where it becomes more difficult to distinguish a positive result from the background instrument signal. The data systems used to generate and report results are programmed to flag values in this range as estimates.

Other qualifiers are applied to advise data users of any validation issues associated with the data. The laboratory makes every effort to meet all of the requirements for generation of data. Occasionally, generation of data that does not meet all the method requirements occurs due to sample matrix or other analytical problems. If the test cannot be repeated or reanalysis would not yield better quality data, qualified data is reported. Qualifiers can be in the form of comments on the analytical report or flags applied to the results.

10.7. Data Reporting

When all analyses are completed, reviewed and verified, a report is generated by the LIMS. The client receives a copy of the report containing the results of the analysis, associated QC data, and where necessary, explanatory comments to address non-conformances. To avoid ambiguity in interpreting results, a summary page that contains an explanation of all symbols and units used in reporting data is included with the Analysis Report submitted to clients. Some regulatory agencies also require the laboratory accreditation identification on the Analysis Reports. Where required, this information is added. The current list of agencies can be accessed in the LIMS. Copies of reports and associated supporting raw data are retained in our archives. The report contains the signature of the assigned client service representative who is the key contact for any questions concerning the results. Personnel authorized to review, sign, and release Analysis Reports are noted in the key personnel list provided in Appendix C.

The laboratory offers a variety of data reporting .levels and formats, from a basic report of sample and QC results only, to a comprehensive data package of QC/calibration information and raw data. The client and any agency involved direct the selection of report type. A summary of report formats and data packages types is provided in the laboratory *Schedule of Services*. Various electronic formats are also available formatted to client-specified file structure and sent via e-mail, direct upload, web-site access (LLabWeb), or common courier. LLabWeb is used for clients that require secure transfer of electronic data.

Client confidentiality of LLabWeb data is ensured by the use of a secured firewall internet environment coupled with the use of a user ID and password to gain login access to the system. User accounts are configured to only allow access to specific data associated with the user's business account number.

Amendments to a final report after issue are in the form of an additional document or data transfer and include a reference to the original report. When a completely new final report is required, it is uniquely identified and includes a reference to the original report it replaces.

10.7.1. Reporting the Results

Analytical reports are generated with a cover page that summarizes all samples in that group. This page lists the laboratory assigned sample number and the corresponding client description. The cover page identifies the laboratory contact person's name and phone number if there is a question about the report. Within this package, each page is uniquely identified and paginated. Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAP accreditation and ISO 17025 unless noted otherwise. Ohio EPA VAP requires that a signed, notarized affidavit accompany each analytical report.

10.8. Data Storage, Security, and Archival

The laboratory has documented procedures and instructions for the identification, collection, access, indexing, filing, storage, maintenance, and disposition of data records. Records are in the form of paper records, electronic data files, magnetic tape, and CD-ROMs.

All data records are maintained in a confidential manner in an environment to minimize deterioration or damage and to prevent loss. Some records are stored in off-site facilities, in such a way that they are readily retrievable. Retention time for records is in accordance with specific procedures or instructions. Prior to the destruction of data/records, and if requested by a client or agency, the laboratory will notify the client/agency that their data is scheduled for destruction so arrangements can be made to have the original data sent to the client.

If specified in client contract(s), archived records are transferred according to their instructions in the event of a change in laboratory ownership or if the laboratory goes out of business. If not specified by the client, the sale agreement must require that archived records be maintained as scheduled by the new owners. In the case of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed.

The laboratory maintains all documentation which is necessary for historical reconstruction of data:

- Analysis reports
- Data notebooks
- Data logbooks
- Instrument output
- Correspondence and client files
- Instrument and equipment logbooks
- QA records
- Corporate documents
- Electronic records

11. AUDITS AND INSPECTIONS

11.1. Internal Quality Assurance Audits

The QA Department, which is independent of laboratory activities, performs routine and on-going system, traceability, and observation audits to objectively review current systems, operations, and procedures as well as automated data integrity audits of electronic data records. The goal of the audits is to ensure that the quality system activities are effective and in compliance with regulatory programs, including NELAP. ISO 17025, DoD, and state agencies, as well as internal policies and procedures. Audits are documented and tracked in a QA database.

Audits are scheduled and conducted following a predefined schedule, based on criticality of operation and prior audit results, with the goal of evaluating systems and technologies across the operation. If warranted, additional audits are performed to follow up on promised corrective action or areas of concern.

Results of an audit are documented in a report format and distributed to applicable management personnel responsible for the area(s) under audit. Management is responsible to address all non-conformances found during an audit with root cause analysis and application of a corrective action plan.

Audit reports and responses are circulated to Management to communicate the outcome of the audit and the proposed plan(s) for corrective action, if warranted. If any of the audit findings cast doubt on the validity of the results, the clients must be notified within three business days of the investigation. Should an audit issue present a major concern regarding validity of laboratory methods, QA personnel can issue a stop work notice.

All records maintained as part of an audit are kept on file for three years.

On an annual basis, an audit of the QA Department is performed as directed by the laboratory's Executive Management. The auditors assigned to carry out this operation are qualified staff members independent of the QA Department.

The specific content and findings of internal audits are considered company confidential and are not shared with clients.

11.2. Review of the Quality Assurance Program

All levels of management are continually updated on the status of quality and compliance by circulation of pertinent documents. Management review is documented by signatures on the documents, electronic records of each person's review, along with any comments or request for additional follow-up. The types of documents circulated real-time include:

- Internal, client, and agency audit reports and responses
- Proficiency test results
- Investigation and corrective action reports
- Monthly QA status reports

Executive management reviews the elements of the total QA program on an annual basis to ensure its continuing suitability and effectiveness in meeting the stated objectives outlined in Section 2.4 of this manual. The evaluation entails review of reports to management, all audit findings, client complaints, laboratory investigations, staff adequacy and training, and projected growth in workload. Patterns or trends in any of these areas are reviewed as a means to continually improve the quality system. This review also includes an evaluation of any audit findings resulting from the audit of the QA Department. At the conclusion of this quality system review, executive management determines the need to introduce changes or improvements into the quality systems at the laboratory. The minutes from the meeting and any recommendations for improvement are documented and a copy is forwarded to the QA staff for review and follow-up.

11.3. Good Laboratory Practice Critical Phase Inspections

Any project that is subject to Good Laboratory Practice (GLP) regulations is audited by the QA Department, as required by the regulations, at intervals adequate to ensure the integrity of the study. Inspections of a GLP project include direct observation of analysts as they perform various phases of the study. Data documentation is reviewed as part of the inspection. The purpose of this type of audit is to ensure that there are no deviations from written methods, procedures, or study protocols.

Results of inspections are documented in a report format and distributed to applicable management personnel responsible for the area(s) under audit. Management is responsible to address all non-conformances found during an inspection. Inspection reports and responses are circulated to applicable laboratory management and an off-site study director, as applicable, to communicate the outcome of the inspection and the proposed plan(s) for corrective action, if warranted.

All records maintained as part of an inspection are kept on file.

11.4. Client Audits

Because clients place great importance on compliance with applicable regulations, data quality, and project requirements, they may audit our facility as assurance that their objectives are being met. QA, management staff, CSRs, and the analytical laboratories play a key role in these audits. Visits by clients can range anywhere from a tour (to verify laboratory facilities and instrumentation) to an intensive inspection of technical operations, procedures, regulatory compliance, and/or review of specific project(s).

- Audits are scheduled directly with the CSR or QA. The request to audit is communicated to all applicable laboratory departments.
- In accordance with our policy on client confidentiality, a client is permitted to review only data and results that apply to their work, or which have been approved by laboratory management.
- An escort (designated laboratory employee) remains with an auditor at all times.

Responsibilities are assigned to the following groups in regard to client audits:

11.4.1. QA Department

- Research previous audit reports and laboratory responses to past deficiencies.
- Follow-up with the applicable analytical laboratory areas to ensure action items were completed from the last audit, as necessary.
- Work with client to set audit agenda.
- Function as an escort during the audit
- Answer questions the auditor has in regard to laboratory and quality systems.
- Take notes of areas where corrective action or suggestions are recommended during the audit.
- Communicate audit issues to management at the completion of the audit.
- Respond to client audit reports.
- Ensure follow-up to cited items are addressed in a timely manner.

11.4.2. CSRs

- Gather and organize relevant information (e.g., client correspondence, analysis/project requests, copies of analytical data from archives).
- Be knowledgeable about client-specific project requirements and issues.
- Function as an escort during the audit.
- Communicate issues/problems to appropriate personnel.

11.4.3. Laboratories

- Gather and organize laboratory data and documentation in preparation for client review.
- Assure corrective action was implemented from past audit findings, if necessary.
- Be prepared to discuss project data/testing results during the audit.
- Be familiar with client-specific project requirements and be prepared to answer client questions.
- Be familiar with the location of routine laboratory information and equipment (e.g., SOPs, data notebooks, calibration data, etc.).
- Be prepared to answer specific technical questions in regards to laboratory procedures and instrumentation within the area.
- Functions as an audit escort within the department during the audit.
- Laboratory managers may function as an escort during the audit

11.5. Agency Inspections

It is laboratory policy to cooperate to the fullest extent and maintain cordial relations with all government agencies. The QA Department is assigned the responsibility of hosting and working with agency representatives. Their role includes, escorting the investigator(s); ensuring all questions are answered promptly and accurately; making note of all unresolved issues; informing management of the audit status and outcome; responding to the audit report and ensuring that appropriate corrective action is completed.

Inspections can be performed by investigators or auditors from the EPA, states, third-party accreditation bodies (i.e. A2LA, United States Department of Agriculture (USDA), or other regulatory agencies.

Government agencies have the right to investigate and inspect the laboratory during normal business hours and permission to inspect is granted by Executive Management.

Designated members of the QA Department are primary contacts for announced inspections. The QA Director is the primary contact for all unannounced agency inspections. If the QA Director is unavailable, Executive Management is notified, in addition to a member of the QA Department. The QA Director, or their designee, must obtain evidence of the investigator's authority either in the form of a letter or examination/explanation of credentials.

Inspections include the examination of records or the inspection of facilities. Investigators are usually concerned only with the records relating to their responsibilities. As a general rule, they are given copies of records and documents, if requested. The laboratory must have a record of all items provided to an investigator.

Investigators must be escorted through the laboratory. The laboratory is not obligated to show an investigator the following types of information: sales, financial or pricing information, or any personnel data other than training or qualification documentation. On a case-by-case basis, internal QA audit reports and investigation reports are made available for agency review. Any questions or concerns about a request made by an investigator in regard to recording devices or photographs must be reviewed with legal counsel.

The laboratory personnel are not permitted to sign affidavits. If an affidavit is presented during an inspection, all personnel are directed not to sign it, read it, nor listen to it being read. The only document that is acceptable to sign is an acknowledgement that an inspection report has been received. If there is any doubt as to what should be signed, legal counsel must be consulted.

11.6. Proficiency Testing

Many of the organizations that certify our laboratory to perform various analyses require proof of our competency. Laboratory performance is checked regularly by participation in a variety of proficiency testing (PT) programs. When available, blind samples are obtained from vendors that are accredited to provide PT samples under the TNI and/or ISO 17025 standards for all test and matrices routinely tested at the laboratory. In addition, some individual certification programs require analysis of specific sets of proficiency samples. The laboratory also chooses to participate in a double blind program.

Generally, the PT programs consist of samples or ampulated spiking solutions used to fortify laboratory samples. The laboratories analyze the samples in the same manner as a client sample and the data is sent to the agency or vendor for evaluation. After the study results are returned to the laboratory, any data falling outside the acceptance criteria is investigated, root cause is identified, and corrective action is implemented, if needed. Results are circulated to management. No PT samples or portion of a PT sample are sent to another laboratory for analysis.

Double blind samples are submitted to the laboratories by the Client Services Department using a fictitious client name so that the analysts are not aware that the samples are PTs. The samples are submitted quarterly and include a cross-section of organic and inorganic tests. The acceptance criteria for these double blind samples are developed statistically using data from participating laboratories, providing a source of inter-laboratory comparison. Results are reviewed, investigated as needed, and circulated to management.

If a trend in PT failures is identified, additional blind samples are ordered for that specific test as corrective action.

Clients routinely submit blind and double blind samples to evaluate the laboratory's performance. If a report is issued to the laboratory, it is handled in the same manner as a scheduled PT study evaluation and follow-up.

12. CORRECTIVE AND PREVENTIVE ACTION

12.1. Laboratory Investigations and Corrective Action

Due to the technical nature of laboratory work and the broad scope of our QA program, a wide variety of laboratory issues can require investigation, root cause analysis, documentation, and corrective action. Prompt investigation and implementation of corrective action ensure that only data of known quality are reported and prevent the recurrence of errors. The following list provides "examples" of the type of issues that warrant investigation:

- Noncompliant QC results*
- Failed PT samples
- Reporting incorrect results
- Contamination issues
- Client technical complaints
- Procedural errors
- Missed holding times
- Systematic problems that compromise the accuracy or compliance of the data generated
- Problems with instrumentation and equipment which could compromise the data generated

These investigations must include the following:

- Identification of the problem
- Steps taken to investigate the problem
- Explanation of probable root cause(s) of the problem
- Steps taken to prevent future occurrence
- Determination of samples or systems affected by the problem

*Note: individual QC noncompliance does not require in depth investigation. Actions are taken as defined in the corresponding method and documented in the data. An adverse trend with noncompliance would be investigated.

Management is informed of problem situations. The QA staff track documentation, the status of the investigation activities, evaluates investigations for completeness and appropriateness, and monitors corrective action for follow-up/closure. Technical management and/or QA may issue a stop work notice if issues indicate the potential for problems on a broad scale or present a critical concern regarding the validity of the laboratory methods. The goal is to identify root cause, have the corrective action implemented promptly, and to the degree appropriate for the magnitude and risk of the problem. Tracking and trending of laboratory issues is performed by QA staff and reported to management on a monthly basis or immediately upon detection of a trend with potential for putting the laboratory or our clients at risk.

12.2. Investigation Processes

All results from quality control (QC) samples are logged into the LIMS quality control system, which is programmed to alert analysts to unacceptable results. Analysts are required to review the results and determine the source of the problem. The source of the problem and proposed corrective action must be documented. Corrective action may include, but is not limited to, re-analysis, re-extraction or re-digestion, instrument maintenance, or re-calibration. If these actions do not yield compliant data within the required hold time, a Nonconformance Form is initiated to document actions and communication with the client. The original form is archived with the associated raw data. Nonconformance Forms are reviewed by the technical department's management, or designee. A copy of the form is reviewed by QA.

Missed holding times are investigated and documented using a Missed Holding Time form. The form includes documentation of the affected samples, reason the hold was missed and corrective actions taken, if applicable. Each form also has documented review and approval by the department manager, department director and the QA Director. Clients are informed of any problems involving holding time.

Other types of problems having potential impact on data quality or involve deviations to our processes are investigated and documented using an Investigation and Corrective Action Report (ICAR). This process was developed to ensure that laboratory problems are investigated, evaluated for root cause, corrective action is put into place to prevent recurrence, laboratory management review and QA approval occurs, and all steps are documented. These investigations are initiated and managed through a workflow interface (Jira). Any employee can initiate an ICAR through this system to document a laboratory problem. The investigation must be completed by designated members of management and approved/closed by QA. Each investigation has a unique tracking number assigned by Jira. Closed investigations are routed to the laboratory Vice-President, associated laboratory Director and the QA Director. Follow-up to ensure effective corrective action is managed by QA staff.

If a laboratory error is identified from the outcome of the investigation that impacts validity of client data, the client must be immediately notified in writing of the situation and corrected data provided as soon as possible. If the root cause of the problem has affected any other client sample results, all affected clients are notified immediately of the problem.

12.3. Client Feedback

The laboratory is in the business of providing high quality analytical testing services. The data that we supply to our clients must be technically complete, accurate, and compliant with applicable regulations. Complaints can be received via letter, phone call, e-mail, or face-to-face meeting.

When a complaint is received, it is our responsibility to determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The CSR is responsible for entering client concerns into the LIMS and an automated summary report is sent to QA on a weekly basis for review. In some cases, an ICAR is initiated to address and document the situation. While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will issue an ICAR if a trend is evident.

On an annual basis, the laboratory sends a client satisfaction survey to all clients. The results of these surveys are compiled, routed to the laboratory Vice-President, technical and operations directors and the QA Director, and used to identify areas of improvement for the laboratory.

12.4. Preventive Actions

All employees are empowered and encouraged to use the concept of Preventive Action to avoid a problematic situation. The company supports, embraces and drives the process for continuous quality improvement by several means, such as: Ethics Hotline, the Suggestion Box (accessible to all employees on the company's Intranet 'LabLinks'), and training classes that include “Making Quality a Science" and Ethics. If an employee identifies a potential problem or an area of concern or it should be brought to the attention of his/her supervisor, Human Resources, QA Director or the Ethics Hotline.

The laboratory also utilizes a formal program to encourage preventive action through development of lean processes. The goal of this program is to optimize processes to ensure efficiency and operational improvements while maintaining compliance. The efficiency gains are inherently coupled with minimizing errors and rework. Teams of employees learn the tools and techniques to evaluate a process, identify potential sources of errors, delays or problems in an operation, determine system changes that will minimize these and work to implement the improvements. Each project includes thorough documentation of the evaluation, measurement, and implementation phases. The process is continually monitored to ensure that the anticipated results are sustained.

Employees are also encouraged to communicate to their supervisor any area(s) or operation(s) that they believe could be streamlined, make their job easier, would provide a quality improvement, or could provide a cost savings to the company.

Described below are some of the systems available to employees to assist with building quality and efficiency into their daily jobs. They stress a proactive approach/environment to problem solving and to review quality systems and operational efficiencies.

- "Making Quality a Science" is an introductory total quality management (TQM) course required for all employees to teach why quality is important and to explain the laboratory's quality philosophy and processes, and how to apply quality thinking and techniques on the job. Topics discussed include: communication, teamwork, serving the client, measurement, quality tools, and continuous process improvement. To foster continuous improvements of laboratory systems, process improvement teams are formed, as needed, if an employee needs help in solving a problem or addressing an issue. The goal of these groups is to have representation from various areas of the laboratory work together to look at a problem, evaluate the need for a temporary fix, brainstorm root causes, plan process improvement, implement the process improvement, evaluate and follow-up to the corrective action.

- "Putting our Values to Work" (Ethics) is a seminar required for all employees to teach the laboratory's Statement of Values by examining how it translates to our everyday jobs and ethical decision making. Topics discussed include: Statement of Values, ethical paradigms, and ethical decision making. Mandatory ethics training refresher seminars are offered on an annual basis.

- The laboratory has contracted with an Ethics Hotline to provide an anonymous means of reporting ethics concerns or issues. The issue is forwarded by the service to the QA Director who will communicate internally with those who need to address the issue. All communication and actions are documented in a secure web interface managed by the hotline service company.

- The QA staff prepares monthly program status reports for management. The reports include a variety of metrics and graphs which are used to evaluate trends in laboratory performance across all quality and compliance areas. Management responds to any negative trends by developing a corrective action plan.

- The laboratory uses a Project Cycle process (further described in section 13.2) to proactively review and prepare for client projects in an effort to ensure full understanding by all laboratory staff of the client's needs and resolve any concerns in advance of receiving the work.

13. SERVICE TO CLIENTS

13.1. Service to Clients

We value our client relationships and support these partnerships through the following principles:

- Honesty and Fairness – Our corporate culture is founded on the principles of professionalism and high ethical standards in dealing with our clients. This may mean declining to provide the service requested (if we are convinced that to do so would be meaningless) or it may mean referring clients outside of our laboratory if we believe that another company can better meet their needs.

- Complete Service – We will give our clients full value on every service provided. We will provide detailed information on our methods, procedures, and QA programs if requested, and take a personal interest and initiative in helping solve our client's problems within the area of our professional expertise.

- Trustworthiness – All data and information developed for a client will be held confidential and not disclosed to a third party except on written request of the client. If information is subpoenaed, we must, by law, release it, but the client will be informed of the release.

- Commitment to Quality – We constantly strive to improve our service in quality, flexibility, and dependability, to keep our competitive edge. We will achieve this through: meeting the requirements of those we serve, staying apprised of regulatory and industry expectations, and providing prompt responses to client concerns.

- Basics of Superlative Service – Our focus is on our client's success. Through proactive collaborative communication, our leadership ensures we understand our client's expectations and strives to exceed them. We foster a service culture in our training, reward and recognition, and performance management process so each employee takes ownership to deliver superlative service to our clients. Feedback from clients, whether positive or negative, is an important part of our continuous improvement system. Ways in which feedback is gathered can include, but is not limited to, customer satisfaction surveys, client audits, and the customer complaint system, which is described within section 12.3.

We also view our fellow employees as our clients since they frequently receive the results of our labor. Meeting the requirements of the next employee in the workflow process is just as important as meeting the needs of an external client.

13.2. Review of Work Requests, Tenders, and Contracts

The laboratory places great importance on understanding and meeting client requirements for a project. We ensure, to the best of our ability, that client/project requirements are identified and communicated through the laboratory. Project evaluation can be achieved in various ways, including the review of analytical methods, protocols, business contracts, and quality project plans (QAPPs). The project review encompasses our Project Cycle process and individual topics to be evaluated for a project include, but are not limited to: scope of testing; required accreditations (i.e. individual state agencies, NELAP, DoD, and ISO 17025) held by the laboratory; appropriate and current testing methods; ability to meet project required reporting limits and QC (if applicable); inconsistencies clarified; and nonstandard work requests.

Project kick-off meetings can be arranged through the CSR or Business Development Group. These meetings allow the client and key technical personnel to discuss project issues and requirements prior to project initiation. Any differences between laboratory processes and the project requirements are discussed and addressed with the client and the laboratory staff before the project is accepted and samples arrive. Testing that cannot be performed at the laboratory may be subcontracted to another laboratory (see 13.4).

A key client contact, the CSR, is assigned to oversee the project. Communication between the client and laboratory staff is available and is coordinated through the CSR.

As a project continues, the CSRs provide continuous communication and status reports (if requested) about the project to the client. The CSR relays any project changes or modifications to the technical groups. If the client submits revised project documents (QAPPs, etc.) then the Project Cycle review process is repeated. The CSR also communicates any issues encountered by the technical laboratories back to the client and vice-versa.

13.3. Timely Delivery

Evaluating laboratory capacity and ability to perform specific projects is a joint responsibility between the Technical Director, Business Development, and the laboratory managers. We recognize that one of the most important aspects of the service we offer is turnaround time.

Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in the laboratory area creating operation flexibility for routine work. Larger projects are reviewed against capacity estimates before bids are submitted to ensure that the client's schedule is met. Turnaround time is continually measured.

Regularly scheduled meetings are held with technical and support management, and project management personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory.

Management receives a daily report of the status of all samples in the lab, including those with priority status or those that have exceeded a preset turnaround time. This enables the planning and organizing of the workload through efficient scheduling.

Any changes to the established timeline by the client or the laboratory must be communicated to the client or laboratory as soon as possible. Upon communication of changes, a new timeline is established and agreed upon by both parties. If a client requires a change in the scope of the project (e.g., number of samples submitted, change in analyses, revised protocol) the laboratory must be informed in writing and a new timeline and cost estimate is be provided.

13.4. Subcontracting

The laboratory may subcontract tests to other laboratories if the requested testing is not routinely performed in our laboratory. To a lesser extent, samples may need to be subcontracted to an overflow laboratory to ensure hold times and/or turn-around-times (TAT) are met.

Testing is only subcontracted with the client's knowledge and approval. The CSR must notify the client in writing when any of their requested analyses will be subcontracted to another lab. Client approval must be obtained in writing before samples are shipped.

Subcontract laboratories are selected based on their qualifications and accreditations. The subcontractor is requested to sign a Laboratory Analytical Services Subcontract. See form 9033100 to review details of the contract terms and information requested from the subcontract laboratory. If projects require a specific agency certification (i.e. individual state agencies, National Environmental Laboratory Accreditation Program (NELAP), Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP), and ISO 17025), only an appropriately accredited laboratory is used. The client may also have a list of laboratories to be used for subcontracting. In these cases, the evaluation of the subcontract laboratory is made by the client.

Data obtained from subcontract laboratories is clearly marked as such when reported by the laboratory. The data are submitted to the client in the format obtained from the subcontractor.

13.5. Use of NELAP and A2LA logo

It is not laboratory policy to use these logos on any company letterhead, including analytical reports.

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Procedure Cross Reference List

NOTE: SOPs and Forms are indicated in the table with the unique Document Control Database number starting with “90…”. The topic of the document is given in parentheses.

Section #	Title	Procedure(s)
1	Introduction	
1.1.	Mission Statement	Employee Handbook
1.2.	Quality Policy	9007879 (Quality Statement) Employee Handbook
1.3.	Statement of Values	Employee Handbook
1.5.	Certifications, Accreditations, and Registrations	9007852 (Cert Summary) Company website
2	Organization and Personnel	
2.1.1	Business Continuity and Contingency Plans	9017347 (Incident Response Plan) 9017681 (Preparedness, Contingency) 9017358 (Archiving SOP) 9021762 (Deputies form)
2.2.	Organizational Structure	Organization Charts
2.3.	Management Responsibilities	PQDs (job descriptions) PMDs (individual job plans)
2.4.	Overview of the Quality Assurance Program	Dept 4052 SOP Series
2.5.	Quality Assurance Responsibilities	Dept 4052 SOP Series
2.6.	Communication of Quality Issues to Management	9020717 (QA Reports)
2.7.	Personnel Qualifications and Responsibilities	9017379 (Employee Training) PQDs (job descriptions) PMDs (individual job plans) Task Specific Training
2.8.	Relationship of Functional Groups and the Quality Assurance Program	Quality Orientation TQM Training PMDs (individual job plans) Dept 4052 SOP Series 9017338 (Project Cycle)
2.9.	Balancing Laboratory Capacity and Workload	PMDs (individual job plans) LIMS reports for mgt
2.10.	Identification of Approved Signatories	9017322 (Date Entry, Verification and Reporting)
2.11.	Personnel Training	9017379 (Employee Training) 9015390 (DOCs) PQDs (job descriptions) PMDs (individual job plans) Task Specific Training
2.12.	Regulatory Training	9022322 (GLP)

Section #	Title	Procedure(s)
2.13.	Employee Safety	Analytical Methods Chemical Hygiene Plan 9017681 (Preparedness) Dept 6098 SOP Series PMDs (individual job plans)
2.14.	Client Services/Project Management Responsibilities	Dept 4039 SOP Series 9017338 (Project Cycle)
2.15.	Confidentiality	Employee Handbook 9017360 (E-mail System) 9022134 (Client and Agency Audits)
2.16.	Business Conduct	Employee Handbook
2.17.	Operational Integrity	9017675 (Manual Integration) 9017333 (Chromatographic Integration) 9017679 (Ethics Policy) 9007879 (Quality Statement)
3	Buildings and Facilities	
3.1.	Facility	Floor Plans
3.2.	Security	9017366 (Building Security)
3.3.	Disaster Recovery	9017347 (Incident Response Plan)
3.4.	Environmental Monitoring	9017311 (VOA Storage) 9021509 (ETM)
3.5.	Water Systems	9017368 (Reagent Water)
3.6.	Housekeeping/Cleaning	9017373 (Housekeeping)
3.7.	Insect & Rodent Control	9017367 (Insect & Rodent Control)
3.8.	Emergency Power Supply	9017347 (Incident Response Plan)
3.9.	Facility Changes	9017364 (Facility Change Control) 9028515 (Change Control)
4	Document Control	
4.1.	Hierarchy of Internal Operating Procedures	9017356 (Writing SOPs)
4.2.	Document Approval, Issue, Control, and Maintenance	9017357 (Document Control) 9017329 (Method Validation)
4.3.	Client-Supplied Methods and Documentation	9021833 Analytical Decision Making) 9022599 (QA review of QAPPs) 9017338 (Project Cycle) 9015436 (Auditing Paperwork)
4.4.	Laboratory Notebooks, Logbooks, and Forms	9017357 (Document Control) 9021767 (Notebooks)
4.5.	Control of External Documents	9017357 (Document Control) Departmental “Controlled Documents” forms

Section #	Title	Procedure(s)
5	Sample Handling	
5.1.	Sample Collection	Dept 4031 SOP Series
5.2.	Sample Receipt and Entry	Dept 6042 SOP Series
5.3.	Sample Identification and Tracking	Dept 6042 SOP Series 9017318 (LSAR)
5.4.	Sample Storage	Dept 6055 SOP Series
5.5.	Sample Return/Disposal	9015512 (Sample Discard) 9017352 (Hazardous Wastes - Lab) 9017756 (Hazardous Wastes – Storage)
5.6.	Legal Chain of Custody	9017335 (Legal COC)
5.7.	Representativeness of Samples	Analytical Methods 9017334 (Representative Solid Samples)
6	Technical Requirements - Traceability of Measurements	
6.1.	Reagents and Solvents	9017328 (Reagents and Standards) Analytical Methods
6.3.	Calibration Standards	9017328 (Reagents and Standards) Analytical Methods
6.4.	Equipment and Instrumentation	9017325 (Inst. & Equip M&C) 9015389 (Balance, Syringe, Pipette Verification)
6.5.	Computerized Systems and Computer Software	9028515 (Change Control) 9017361 (Network Accounts) 9017360 (E-mail System) 9017710 (Computer Backup) Employee Handbook 9017712 (Computer Viruses)
6.6.	Change Control	9028515 (Change Control)
6.7.	Labware Cleaning	Departmental Procedures
7	Purchasing Equipment and Supplies	
7.1	Procurement	9021705 (Procurement) 9018236 (Receipt of Lab Supplies)
7.2	Supplier Evaluation	9021705 (Procurement) 9017310 (Subcontracting) 9017328 (Reagents and Standards) 9015516 Preservative Checks)

Section #	Title	Procedure(s)
8	Analytical Methods	
8.1.	Scope of Testing	Schedule of Services Company website
8.2.	Analytical Test Methods	9017329 (Method Validation) 9023483 (Writing Procedure Guidance)
8.3.	Client Supplied Methods	9017329 (Method Validation)
8.4.	Method Validation	9017329 (Method Validation)
8.5.	Procedural Deviations	9017331 (ICARs)
9	Internal Quality Control Checks	
9.1.	Laboratory Quality Control Samples and Acceptance Criteria	9017313 (QC Limits) Analytical Methods
9.2.	Quality Control Sample Frequency and Corrective Action	9017315 (Noncompliant Data) Analytical Methods
9.3.	Quality Control Charts	9018253 (End of Month QC Reports)
9.4.	Measurement Uncertainty	9017313 (QC Limits)
10	Assuring Quality of Test Results	
10.1.	Data Management	9021767 (Notebooks)
10.2.	Data Documentation	9021767 (Notebooks) 9017322 (Date Entry, Verification and Reporting) 9007879 (Quality Statement)
10.3.	Data Calculations	9017322 (Date Entry, Verification and Reporting) Analytical Methods
10.4.	Reporting Limits	9017309 (MDLs & LOQs)
10.5.	Data Review	9021767 (Notebooks) 9017322 (Date Entry, Verification and Reporting)
10.6.	Data Qualification	9017315 (Noncompliant Data)
10.7.	Data Reporting	9017322 (Date Entry, Verification and Reporting) 9017330 (MCL Exceedance)
10.8.	Data Storage, Security, and Archival	9017358 (Data Archiving) 9017710 (Computer Backup)
11	Audits and Inspections	
11.1.	Internal Quality Assurance Audits	9020535 (Internal Audits) 9022322 (GLP) 9008821 (Internal Audit Checklist)
11.2.	Review of the Quality Assurance Program	9020535 (Internal Audits) 9020717 (QA Reports)
11.3.	Good Laboratory Practice Critical Phase Inspections	9022322 (GLP)
11.4.	Client Audits	Employee Handbook 9022134 (Client and Agency Audits)

Section #	Title	Procedure(s)
11.5.	Agency Inspections	Employee Handbook 9022134 (Client and Agency Audits)
11.6.	Proficiency Testing	9017321 (PT Program) 9018237 (PT Entry)
12	Corrective and Preventive Action	
12.1.	Laboratory Investigations and Corrective Action	9017315 (Noncompliant Data) 9017331 (ICARs) 9017332 (Client Complaints)
12.2.	Investigation Processes	9017326 Missed Hold Procedure) 9007810 (Missed Hold form) 9017331 (ICARs)
12.3.	Client Feedback	9017332 (Client Complaints) Annual Client Survey
12.4.	Preventive Actions	Corporate Training Lean Projects 9017338 (Project Cycle) 9028515 (Change Control) 9020535 (Internal Audits)
13	Service to Clients	
13.1.	Service to Clients	Employee Handbook Ethics Statement 9007879 (Quality Policy) TQM Training
13.2.	Review of Work Requests, Tenders, and Contracts	9015436 (Client Paperwork) 9017338 (Project Cycle) 9018254 (QAPP Review)
13.3.	Timely Delivery	9015434 (Tracking Rush Samples) 9015437 (Scheduling Rush Samples) Departmental LIMS reports
13.4.	Subcontracting	9033100 (Subcontractor Checklist) 9017310 Subcontracting) 9017338 (Project Cycle)

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Local Document Category	ES - Environmental Sciences		

Prepared by	Barbara Reedy
Reviewed and Approved by	Duane Luckenbill;Review;Sunday, December 13, 2015 10:18:02 PM EST Dorothy Love;Approval;Thursday, December 17, 2015 3:55:34 PM EST

Agency	Parameter	Applicable Matrices	Lab ID No.
Federal Programs:			
American Association for Laboratory Accreditation (A2LA)	Organics, inorganics, dioxin per ISO 17025 and DoD QSM 5.0, KY UST, WY Storage Tank Program, Food and Feed, and PFAAs	Potable water, nonpotable water, solid and hazardous waste, air, tissue and tobacco	0001.01
USDA Quarantine Soil Permit	All	Solid	PCIP-14-00703
State Programs:			
State of Alaska, Department of Environmental Conservation	Organics, inorganics, UST analysis	Nonpotable water, solid and hazardous waste	UST-061
State of Arizona, Department of Health Services	Dioxin	Potable water, nonpotable water, solid and hazardous waste	AZ0780
State of Arkansas, Department of Environmental Quality	Organics, inorganics, dioxin	Nonpotable water, solid and hazardous waste	88-0660
State of California, Department of Health ELAP	Organics, inorganics, dioxin	Potable water, nonpotable water, solid and hazardous waste	2792
State of Colorado, Department of Public Health and Environment	Organics, inorganics, dioxin	Potable water	None
State of Connecticut, Department of Public Health	Organics, inorganics, dioxin, micro	Potable water, nonpotable water, solid and hazardous waste	PH-0746
State of Delaware, Health and Social Services	Organics, inorganics, dioxin, micro	Potable water	None
[3]State of Florida, Department of Health	Organics, inorganics, dioxin, micro	Air and emissions, potable water, nonpotable water, solid and chemical materials	E87997
[3]State of Hawaii	Organics, inorganics, dioxin	Potable water	None
[3]State of Illinois, Environmental Protection Agency	Organics, inorganics, dioxin	Nonpotable water, solid and chemical materials	200027
State of Iowa, Department of Natural Resources	Organics, inorganics, UST analysis	Nonpotable water, solid and hazardous waste	361
[3]State of Kansas, Department of Health and Environment	Organics, inorganics, dioxin	Potable water, nonpotable water, solid and chemical materials	E-10151
Commonwealth of Kentucky, Department of Environmental Protection, Drinking Water Certification Program	Organics, inorganics, dioxin	Potable water	90088
Commonwealth of Kentucky, Department of Environmental Protection, Wastewater Certification Program	Organics, inorganics, dioxin, micro	Nonpotable water	90088
[4]Commonwealth of Kentucky, Department for Environmental Protection – UST Branch	Organics, metals, UST analysis	Nonpotable water, solids	89
[1, 3, 5] State of Louisiana, Department of Environmental Quality	Organics, inorganics, dioxin	Air emissions, biological tissue (direct accreditation), nonpotable water, solid chemical materials	30729 02055
State of Maryland, Department of the Environment	Organics, inorganics, dioxin, micro	Potable water	100
Commonwealth of Massachusetts, Department of Environmental Protection	Organics, inorganics	Nonpotable water	M-PA009

eurofins Lancaster Laboratories Environmental	Document Title: Certifications, Accreditations, Registrations and Contracts		
	Eurofins Document Reference: 1-P-QM-FOR-9007852	Revision: 23	Historical Reference: Form 2528
	Effective date: Oct 12, 2015		Status: Effective

Agency	Parameter	Applicable Matrices	Lab ID No. Certificate No.
State of Michigan, Department of Environmental Quality	Organics, inorganics, dioxin	Potable water	9930
State of Missouri, Department of Natural Resources	Organics, inorganics	Potable water	450
State of Montana, Department of Public Health and Human Services	Organics, inorganics, dioxin	Potable water	CERT0098
State of Montana, Department of Environmental Quality	Organics, UST analysis	Nonpotable water, solid and chemical materials	None
[3]State of Nevada, Division of Environmental Protection	Organics, inorganics, dioxin	Potable water, nonpotable water, solid and chemical materials	PA00009
[3]State of New Hampshire, Department of Environmental Services	Organics, inorganics, micro	Potable water, nonpotable water, solid and chemical materials	2730
[3]State of New Jersey, Department of Environmental Protection (NJDEP)	Organics, inorganics, dioxin, micro	Air and emissions , potable water, nonpotable water, solid and chemical materials,	PA011
[3]State of New York, Department of Health	Organics, inorganics, dioxin, micro	Air, nonpotable water, potable water, solid and chemical materials	10670
State of North Carolina, Department of the Environment and Natural Resources	Organics, inorganics	Nonpotable water	521
State of North Carolina, Department of Health and Human Services	Organics, micro	Potable water	42705
State of North Dakota, Department of Health	Organics, inorganics, dioxin	Potable water, nonpotable water	R-205
State of Ohio, Environmental Protection Agency (Voluntary Action Program)	Organics, inorganics	Nonpotable water, solid and hazardous waste	CL0070
State of Oklahoma, Department of Environmental Quality	Organics, inorganics, dioxin	Nonpotable water, solid and hazardous waste	9804
[3]State of Oregon, Public Health Laboratory	Organics, inorganics, dioxin	Air, nonpotable water, solid and chemical materials	PA200001
[2]Commonwealth of Pennsylvania, Department of Environmental Protection (Bureau of Laboratories)	Organics, inorganics, dioxin, micro	Potable water, nonpotable water, solid and chemical materials (direct accreditation)	36-00037
State of Rhode Island, Department of Health	Organics, inorganics	Potable water, nonpotable water	LAO00338
State of South Carolina, Department of Health and Environmental Control	Organics, inorganics, dioxin	Potable water, nonpotable water, solid and hazardous waste	89002 89002002
State of Tennessee, Department of Environment & Conservation	Organics, inorganics, dioxin	Potable water	TN02838
[3,5]State of Texas, Commission on Environmental Quality	Organics, inorganics, dioxin, micro	Air and emissions, potable water, nonpotable water, solid and chemical materials, biological tissue (direct accreditation)	T104704194
[3]State of Utah, Department of Health	Organics, inorganics, dioxin	Potable water, nonpotable water, solid and hazardous material	PA00009

Eurofins Lancaster Laboratories Environmental	Document Title: Certifications, Accreditations, Registrations and Contracts		
	Eurofins Document Reference: 1-P-QM-FOR-9007852	Revision: 23	Historical Reference: Form 2528
	Effective date: Oct 12, 2015		Status: Effective

Agency	Parameter	Applicable Matrices	Lab ID No. Certificate No.
State of Vermont, Department of Health Laboratory	Organics, inorganics, dioxin, micro	Potable water	VT 36037
[3] Commonwealth of Virginia, VELAP	Organics, inorganics, dioxin, micro	Air, Potable water, nonpotable water, solid and chemical materials	460182
State of Washington, Department of Ecology	Organics, inorganics, dioxin	Air, Potable water, Nonpotable water, solid and chemical materials	C457
State of West Virginia, Department of Health and Human Resources	Organics, inorganics	Potable water	9906C
State of West Virginia, Department of Environmental Protection	Organics, inorganics, dioxin, micro	Nonpotable water, solid and chemical materials, hazardous waste	055
State of Wisconsin, Department of Natural Resources	Organics, inorganics, dioxin	Nonpotable water, solid and hazardous waste	998035060
State of Wyoming and all Tribal Public Water Systems in Region 8	Organics, inorganics, dioxin, micro	Potable water	8TMS-L
[4]State of Wyoming – UST Branch	Organics, metals, UST analysis	Nonpotable water, solids and hazardous waste	None

[1]NELAP Primary AB: Air and Emissions
[2]NELAP Primary AB: Potable Water, Nonpotable water, solid and chemical materials
[3]NELAP Secondary AB
[4]Approval for UST work by A2LA
[5] NELAP Primary AB: Biological Tissue

NOTE: This list accurately reflects the certifications, accreditations, registrations, and contracts held at the time of publication and is subject to change. Check with your account manager on the status of any certification needed for a specific project. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

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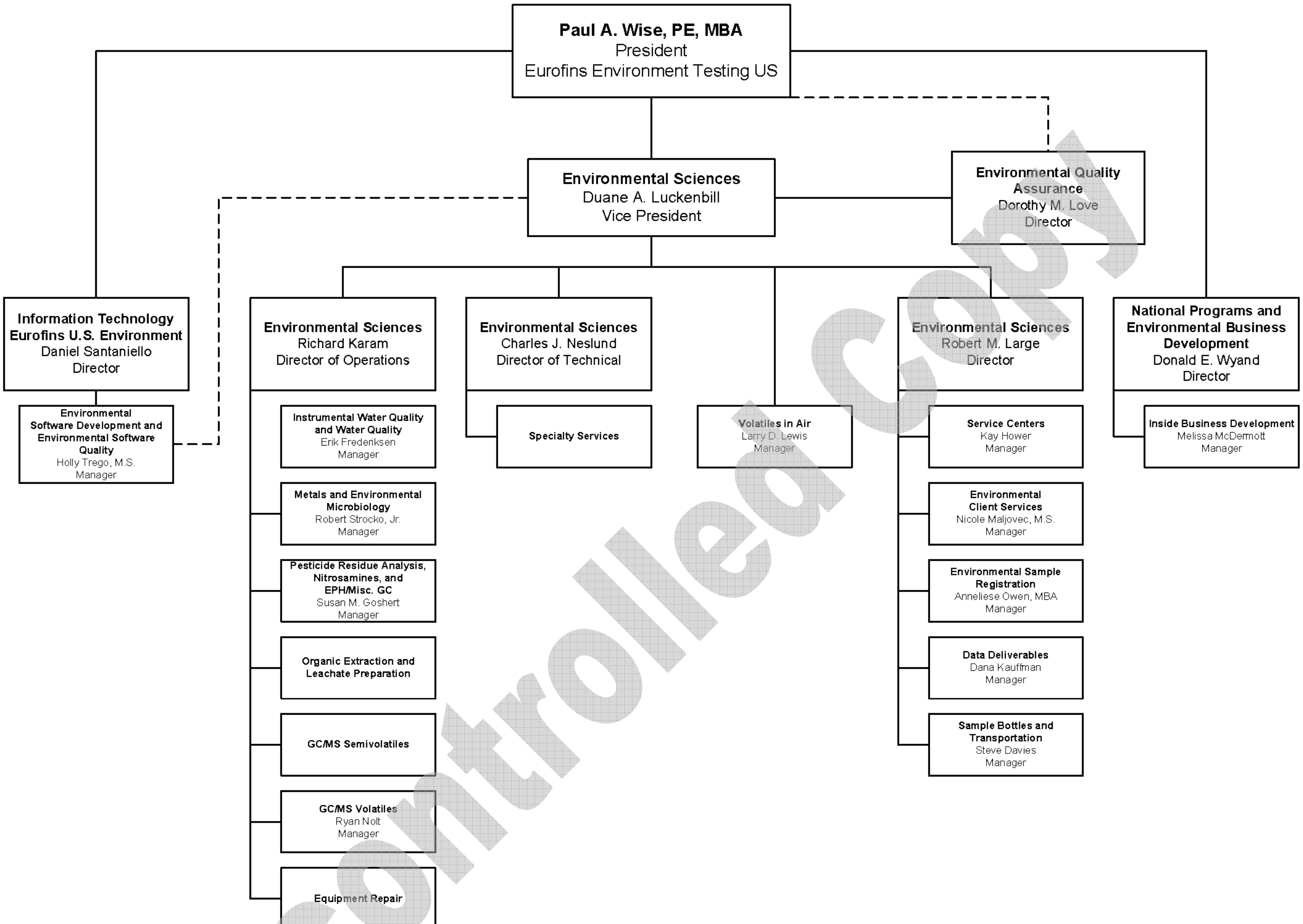
Local Document Category	ES - Environmental Sciences		

Prepared by	Christiane Sweigart
Reviewed and Approved by	Duane Luckenbill;Review;Tuesday, September 29, 2015 8:51:39 PM EDT Dorothy Love;Approval;Wednesday, October 14, 2015 10:25:01 AM EDT

Eurofins Lancaster Laboratories Environmental



Name	Degree	Title
Quality Assurance		
Dorothy Love*	B.S.	Director Scientific Support
Barbara Reedy*	B.S.	Senior Specialist
Christiane Sweigart	B.S.	Senior Specialist
Kathryn Brungard*		Senior Specialist
Environmental Sciences		
Duane Luckenbill	B.S.	Vice President
Donald Wyand	B.S.	Director Sales
Robert Large*	B.S.	Director Operations Support
Richard Karam*	B.S.	Director Scientific
Charles Neslund*	B.S.	Director Scientific
Allon Hull	B.S.	Sr Account Manager
Christine Jampo	M.S.	Sr Account Manager
David Velasquez		Sr Account Manager
Irene Dodd*	M.S.	Operations Sup Pr Specialist I
Jane Huber	B.S.	National Sales Manager
Jenifer Lewis	B.S.	Pr Account Manager
Jeremy Young	B.S.	Sr Account Manager
Joseph Garzio	M.S.	Sr Account Manager
Kevin Moran	M.B.A.	Sr Account Manager
Laura Caulfield	B.S.	Operations Support Spec I
Laura Jovanovic	B.A.	Pr Account Manager
Marianne Bragg*	B.S.	Operations Sup Pr Specialist I
Melissa McDermott*	B.A.	Inside National Sales Manager
Susan Wike	A.S.	Specialist II
Tara Laroche	M.S.	National Sales Manager
Tara Spaide*		Operations Support Sr Spec I
Environmental Client Services and Inside Business Development		
Nicole Maljovec*	M.S.	Manager Operations Support
Wendy Kozma*	B.S.	Principal Specialist Group Leader
Alison Bainbridge	B.A.	Operations Support Spec I
Angela Miller*	B.S.	Operations Support Spec I
Barbara Weyandt*	M.S.	Operations Support Spec I
Deanna Wyand	B.S.	Specialist I
Kaitlin Plasterer*	B.S.	Operations Support Sr Spec I
Katherine Klinefelter*	M.S.	Operations Sup Pr Specialist I
Loran Carter*	B.S.	Operations Support Spec I
Lynn Frederiksen*	B.S.	Operations Sup Pr Specialist I
Lyssa Longenecker*	B.S.	Operations Support Sr Spec I
Megan Moeller*	B.S.	Operations Support Sr Spec I
Melanie Duszynski*		Operations Support Spec I
Nancy Bornholm*	B.S.	Operations Sup Pr Specialist I
Natalie Luciano*	B.A.	Operations Support Sr Spec I
Stacy Butt*	B.S.	Operations Support Spec I

Name	Degree	Title
Taylor Luckenbill	B.A.	Specialist I
Teresa Cunningham*	B.S.	Operations Sup Pr Specialist I
Additional support personnel in this group: 1		
Data Deliverables		
Dana Kauffman*		Manager
F. Bradley Ayars		Principal Scientist GL
Grace Salm		Specialist I
Audrey McClune		Specialist I
Betty Umble		Specialist I
Grace Salm		Specialist I
Jessica Baron		Specialist I
Judi Brown		Specialist I
Kathy Fair		Specialist I
Lydia Steinke	B.S.	Specialist I
M Susan Kreider		Specialist II
Patricia Madrigal-Kauffman	A.S.	Specialist I
Tina McNeil		Specialist I
Tracy Pang-Ward		Specialist I
Additional support personnel in this group: 5		
Service Centers		
Kay Hower*	B.A.	Manager Operations Support
Larry Starkey		Sr Project Manager GL
Ana Spencer*	B.S.	Project Manager
Cassandre Revell*	B.S.	Project Manager
Karen Lopez		Project Manager
Stefanie Mielnicki*	B.S.	Project Manager
Stephen Gordon*	B.S.	Project Manager
Additional support personnel in this group: 2		
Environmental Microbiology		
Robert Strocko*	B.S.	Manager
Hannah Cottman	B.S.	Scientist
Extractable Petroleum Hydrocarbons (EPH)/Miscellaneous GC		
Susan Goshert*	B.S.	Manager
Michele Hamilton*	B.S.	Senior Scientist Group Leader
Christine Dolman	B.S.	Scientist
Heather Williams	B.S.	Senior Scientist
Nicholas Rossi	B.S.	Senior Scientist
Tracy Cole*		Senior Specialist
Tyler Griffin	B.S.	Scientist
Additional support personnel in this group: 1		
Field Sampling		
Samuel Huber	B.S.	Manager
Jeffrey Allen		Courier/Sample Support Spe GL
Timothy Hauck		Courier/Sample Support Spec

Name	Degree	Title
GC/MS Semivolatiles		
Richard Karam*	B.S.	Director
Rachel Cochis*	B.A.	Senior Specialist Group Leader
Ankitaben Patel	M.S.	Scientist
Beth Rubino	B.S.	Senior Specialist
Brian Graham	B.A.	Senior Scientist
Catherine Bachman	B.S.	Scientist
Holly Ziegler	B.S.	Senior Scientist
Joseph Gambler	B.S.	Principal Scientist
Linda Hartenstine	B.A.	Senior Scientist
Mark Ratcliff*	B.A.	Senior Specialist
Matthew Barton*	B.S.	Senior Specialist
William Saadeh	B.S.	Scientist
GC/MS Volatiles		
Ryan Nolt	B.S.	Manager
Kathrine Muramatsu	B.S.	Senior Scientist Group Leader
Kenneth Boley*	B.S.	Senior Scientist Group Leader
Roy Mellott	B.S.	Senior Scientist Group Leader
Amanda Richards		Scientist
Angela Sneeringer	B.S.	Senior Scientist
Anita Dale		Scientist
Brett Kenyon	B.S.	Scientist
Chad Moline*	B.S.	Senior Specialist
Chelsea Stong	B.S.	Senior Specialist
Christine Dulaney*	B.S.	Senior Specialist
Christopher Torres	B.S.	Scientist
Daniel Heller	B.S.E.	Senior Scientist
Jason Long	B.S.	Senior Scientist
Jeremy Giffin	B.S.	Scientist
Kelly Keller		Scientific Support Spec I
Kerri Legerlotz	B.S.	Senior Scientist
Kevin Sposito	B.S.	Senior Scientist
Linda Pape	B.A.	Senior Scientist
Marie Beamenderfer	B.S.	Senior Scientist
Marla Brewer*	B.S.	Senior Specialist
Robin Runkle*	B.S.	Senior Specialist
Sara Johnson	B.S.	Senior Scientist
Sarah Guill	B.S.	Scientist
Stephanie Selis	B.S.	Senior Scientist
Additional support personnel in this group: 6		

Instrumental Water Quality		
Erik Frederiksen*	B.A.	Manager
Nicole Veety		Senior Scientist Group Leader
Clinton Wilson	B.A.	Scientist
Drew Gerhart	B.S.	Scientist
James Mathiot		Scientist
Joseph McKenzie		Scientist
Sandra Miller		Scientist
Additional support personnel in this group: 4		
Metals		
Robert Strocko*	B.S.	Manager
Nina Haller*		Senior Specialist Group Leader
Choon Tian	B.A.	Scientist
Damary Valentin		Scientist
Deborah Krady	B.S.	Scientific Support Spec I
Debra Bryan		Operations Support Spec I
Eric Eby	B.S.	Senior Scientist
Jennifer Moyer	B.S.	Senior Specialist
Katlin Cataldi	B.S.	Scientist
Parker Lindstrom	B.S.	Senior Scientist
Suzanne Will	B.S.	Scientist
Tara Snyder	B.S.	Scientist
Additional support personnel in this group: 7		
Organic Extraction		
Richard Karam*	B.S.	Director
Joseph Feister		Senior Scientist Group Leader
Wanda Oswald		Senior Scientist Group Leader
Darin Wagner	B.A.	Scientist
David Hershey		Scientist
David Schrum		Technician II
Heidi Roberts*	B.S.	Senior Scientist
Jessica Velez	B.S.	Scientist
JoElla Rice		Technician II
Joseph Feister		Senior Scientist Group Leader
Justin Bukeavich		Technician
Kailah Ortiz		Technician
Robert Vincent	B.S.	Principal Scientist
Ryan Schafran	B.S.	Scientist
Shawn McMullen	B.A.	Scientist
Additional support personnel in this group: 20		

Pesticide Residue Analysis		
Susan Goshert*	B.S.	Manager
James Place	B.S.	Senior Scientist
Jamie Brillhart	B.S.	Senior Scientist
Jessica Miller	B.S.	Senior Scientist
Lisa Reinert	B.S.	Scientist
Monica Souders	B.S.	Scientist
Richard Shober	B.S.	Principal Scientist
Valerie Tomayko*	B.S.	Pr Scientific Sup Spec I
Additional support personnel in this group: 1		
Specialty Services Group		
Charles Neslund*	B.S.	Director
Christine Ratcliff	B.S.	Pr Scientific Sup Spec I GL
Brett Weidman	B.S.	Scientist
Deborah Zimmerman		Scientist
Ginelle McQuaid		Scientist
Joseph Anderson	B.S.	Senior Scientist
Meng Yu	M.S.	Principal Scientist
Michael Ziegler	B.S.	Senior Scientist
Michele Smith*	B.S.	Senior Specialist
Paul Cormier	B.A.	Pr Scientific Sup Spec I
Robert Brown		Principal Scientist
Timothy Trees	A.S.	Principal Scientist
Additional support personnel in this group: 3		
Volatiles in Air		
Larry Lewis	B.S.	Manager Scientific
Jeffrey Smith	B.A.	Senior Scientist Group Leader
Jacob Bailey	B.S.	Scientist
Additional support personnel in this group: 1		
Water Quality		
Erik Frederiksen*	B.A.	Manager Scientific
Kenneth Bell*	B.S.	Principal Scientist GL
Hannah Royer	B.A.	Scientist
Michele Graham	B.S.	Scientist
Michelle Lalli		Scientist
Robert Heisey*	B.A.	Senior Specialist
Susan Engle		Scientist
Susan Hibner	B.S.	Scientist
Yolunder Bunch		Scientist
Additional support personnel in this group: 6		

Environmental Software Development		
Holly Trego	B.S.	Manager IT Support
Andrew Strebel		IT Development Pr Spec II
Bret Winey	B.S.	IT Development Sr Specialist
Catherine Holt	B.S.	IT Development Pr Spec II
Chadwick Hershey	B.S.	IT Development Sr Specialist
Christopher Stauffer	B.S.	IT Development Sr Specialist
Diana Holmes	M.S.	IT Development Sr Specialist
Eric Walker		IT Development Specialist
John Riggs	B.S.	IT Development Sr Spec GL
Joshua Peters	B.S.	IT Development Specialist
Tiffany Betz	B.S.	IT Development Pr Spec II
Timothy Weaver	B.A.	IT Development Sr Specialist
Environmental Sample Administration		
Anneliese Owen	M.B.A.	Manager Scientific Support
Carolyn Cyms	B.S.	Senior Specialist Group Leader
Tamara Helsel		Senior Specialist Group Leader
Christine Knoedler	B.A.	Scientific Support Spec I
Deborah Neslund		Specialist II
Katherine Metzger	B.A.	Scientific Support Spec I
Katie Hartlove		Scientific Support Spec I
Kristin Zeigler	B.S.	Scientific Support Spec I
Additional support personnel in this group: 5		
Equipment Maintenance & Repair		
Robert Allison		Facilities Specialist I
Training		
Beth DiPaolo	M.A.	Vice President of PSS & Recruiting/Organizational Development
Kimberly Davies	M.B.A.	Director
Lindsay Deibler-Wallace	M.S.	Senior Specialist Group Leader
Barbara Weaver	M.S.	Pr Scientific Sup Spec I
Harry Ward	PHD	Pr Scientific Sup Spec I
Julia Matesich	B.S.	Scientific Support Spec I
Michael Salgado	B.S.	Senior Specialist
Sample Bottles		
Steven Davies	B.S.	Manager
Karen Guito		Courier/Sample Support Spec
Samantha DeFalcis		Courier/Sample Support Spec
Sandra Muckle		Courier/Sample Support Spec
Additional support personnel in this group: 3		

Sample Support		
Anneliese Owen	M.B.A.	Manager Scientific Support
Chad Wettig		Senior Specialist Group Leader
Lisa Cooke		Scientist
Stephanie Sanchez		Scientist
Additional support personnel in this group: 10		
Transportation		
Steven Davies	B.S.	Manager Operations Support
Christopher Winters		Courier/Sample Support Spec
L Kenneth Miller		Courier/Sample Support Spec
Leon Wolf		Courier/Sample Support Spec
Timothy Miller		Courier/Sample Support Spec
Additional support personnel in this group: 17		
Safety		
Rachel Brady	B.S.	Senior Specialist Group Leader
Beth Rich		Operations Support Sr Spec I
Stephen Nowakowski	B.S.	Senior Specialist
Additional support personnel in this group: 7		

*Denotes those employees who are authorized to release Analysis Reports.

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Prepared by	Christiane Sweigart
Reviewed and Approved by	Duane Luckenbill;Review;Sunday, December 13, 2015 10:15:34 PM EST Dorothy Love;Approval;Thursday, December 17, 2015 3:56:12 PM EST

Jeffrey S. Allen, Courier/Sample Support Group Leader, Field Sampling
Information not available at time of printing

Joseph D. Anderson, B.S., Senior Chemist, Specialty Services Group
Education:
B.S. General Science, Pennsylvania State University (2004)
Professional Experience:
ALSI, GC GC/MS Analyst (2004-2010)
Responsibilities included preparing, running, and reviewing samples according to client and industry methods using various instrumentations including GC and GC/MS; performing analysis for various departments as determined by work volume and staffing needs; reviewing and reporting data within client specified criteria
With Lancaster Laboratories since 2010
Senior Chemist, Flexible Staffing (2010)
Responsibilities included preparing, running, and reviewing samples according to client, compendia, and industry methods using various wet chemistry techniques and instrumentation, which may include but is not limited to, gas chromatography, liquid chromatography, IC, and TOC instrumentation; performing analysis for various departments as determined by work volume and staffing needs
Senior Chemist, Specialty Services Group (2012)
Responsibilities include maintaining instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; diagnosing complex problems and offering solutions with a high degree of independence; suggesting and implementing improvements to maximize quality and productivity; acting as technical resource for internal problems and projects; assisting in "brainstorming" client problems and projects; training new employees in all aspects of instrumentation; researching new and emerging technologies

F. Bradley Ayars, Principal Specialist Group Leader, Data Deliverables
Continuing Education:
Environmental Law & Policy, Franklin & Marshall College (1991)
Professional Experience:
With Eurofins Lancaster Laboratories since 1988
Client Services Specialist (1992)
Environmental Project Management (1994)
Senior Specialist Coordinator, Electronic Data Deliverables (1997)
Responsibilities included supervising EDD staff; developing and maintaining EDD formats; overchecking lab data for EDDs; primary contact for EDD issues
Senior Specialist Group Leader, Electronic Data Deliverables (2005)
Responsibilities included supervising EDD staff; developing and maintaining EDD formats; overchecking lab data for EDDs; primary contact for EDD issues
Principal Specialist Group Leader, Electronic Data Deliverables (2014)
Responsibilities include supervising EDD staff; developing and maintaining EDD formats; overchecking lab data for EDDs; primary contact for EDD issues

Duane A. Luckenbill, B.S., Vice President, Eurofins Lancaster Laboratories Environmental
Education:
B.S. Chemistry, Clarion University of PA (1989)
Continuing Education:
Introduction to Mass Spectral Interpretation, Hewlett-Packard (1995)
Technical Training, OI Analytical (1995)
Professional Experience:
ATEC Associates, Inc., GC/MS Analyst (1989)
With Eurofins Lancaster Laboratories since 1989
Chemist (1991)
Chemist/Coordinator (1993)
Group Leader (1997)
Manager (2001)
Responsibilities included client satisfaction, safety and quality systems administration, and all aspects of financial, personnel, and operations management of the GC/MS Volatiles and GC/MS Semivolatiles groups
Director, Environmental Sciences (2005)
Responsibilities included client satisfaction, safety and quality systems administration, and all aspects of financial, personnel, and operations management of the GC/MS Volatiles, GC/MS Semivolatiles, Volatiles in Air, Organic Extraction, Leachate Preparation, Field Sampling, Pesticide Residue Analysis, Volatiles by GC, and EPH/Miscellaneous GC groups

Vice President, Eurofins Lancaster Laboratories Environmental (2013)
Responsibilities include all aspects of financial, personnel, and operations management of all Technical areas, Environmental Quality and Compliance, Computer Application/Development, and Environmental Support Services while continually focusing on client satisfaction, safety, and quality systems administration; collaborating with other Eurofins US environmental companies to expand national testing capabilities and grow market share in the US

Awards, Citations, Honorary Societies & Publications:
Undergraduate Award in Analytical Chemistry, American Chemical Society (1988)
Department of Chemistry Competitive Award, Clarion University (1988-1989)
Outstanding Senior Chemistry Award, American Institute of Chemists Foundation (1989)
Senior College Award for Chemistry, Society for Analytical Chemists of Pittsburgh (1989)
One publication on mass spectrometry

Matthew Rusty E. Barton, B.S., Senior Specialist, GC/MS Semivolatiles

Education:
B.S. Biochemistry, East Stroudsburg University (1991)

Professional Experience:
With Lancaster Laboratories since 1991
Senior Chemist (1998)
Senior Chemist/Coordinator (1999)
Responsibilities included: supervise personnel; schedule lab work; perform purge and trap gas chromatography testing; operate O.I. 4560/4551, Tekmar 3000, Archon 5100, and HP5890 Series II OC instruments; review and approve data; and developing and evaluating new methods.
Senior Chemist, Nitrosamines (2003)
Responsibilities included: Analysis of nitrites in tobacco samples
Senior Chemist, EPH/Misc. GC (2004)
Responsibilities include: Analysis of environmental samples for diesel range organics via gas chromatography
Senior Specialist, GC/MS Semivolatiles (2008)
Responsibilities include: audit and upload of departmental data

Marie D. Beamenderfer, B.S., Senior Chemist, GC Volatiles

Education:
B.S. Biology, The Pennsylvania State University (2006)

Professional Experience:
With Eurofins Lancaster Laboratories since 2006
Chemist, GC Volatiles (2006)
Responsibilities included maintaining GC instrumentation; calibrating instruments as needed; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing the necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; performing all duties with minimal supervision; training new employees; tracking inventory of instrument parts and standards and entering them into the standards database as received; verifying data on an as needed basis
Senior Chemist, GC Volatiles (2012)
Responsibilities include maintaining GC instrumentation; calibrating instruments as needed analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing the necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; performing all duties with minimal supervision; training new employees; tracking inventory of instrument parts and standards and entering them into the standards database as received; working on special assignments; diagnosing complex problems and offering solutions with a high degree of independence; assisting in “brainstorming” client problems and projects; completing assigned projects on time; verifying data on an as needed basis

Kenneth A. Bell, B.S., Principal Chemist Group Leader, Water Quality

Education:

B.S. Chemistry, Millersville University (1997)

Professional Experience:

Johnsons Chemical, Laboratory Assistant (1989-1992)
Responsibilities included collecting samples and performing testing on raw material
With Eurofins Lancaster Laboratories since 1994
Senior Laboratory Technician, Water Quality (1994)
Responsibilities included routinely performing analytical testing using wet chemistry methods
Chemist/Coordinator, Water Quality (1994)
Responsibilities included performing wet chemistry analyses, sample verification, and coordinating workflow
Senior Chemist/Coordinator, Water Quality (1994)
Responsibilities included coordinating workflow, performing sample verification, back-up report signing, training new employees, revising standard operating procedures, writing annual job plans and reviews
Senior Chemist Group Leader, Water Quality (2005)
Responsibilities included coordinating workflow, performing sample verification, back-up report signing, training new employees, revising standard operating procedures, writing annual job plans and reviews
Principal Chemist Group Leader, Water Quality (2014)
Responsibilities include coordinating workflow, performing sample verification, back-up report signing, training new employees, revising standard operating procedures, writing annual job plans and reviews

Tiffany D. Betz, B.S., Principal Specialist, Environmental Software Development

Education:

B.S. Computer Science, Millersville University (2001)

Continuing Education:

Oracle Exam #1Z0-007, Introduction to Oracle 9i: SQL (May 17, 2004)
Oracle Exam #1Z0-147, Oracle 9i: Program with PL/SQL (August 4, 2004)

Professional Experience:

With Eurofins Lancaster Laboratories since 2000
Specialist, Computer Applications Development (2000)
Responsibilities included performing computer applications development and maintenance.
Senior Specialist, Computer Applications Development (2006)
Responsibilities included performing computer applications development and maintenance.
Principal Specialist, Environmental Software Development (2012)
Responsibilities include analyzing, designing, developing, documenting, validating, and deploying custom software in a regulated environment; conforming to FDA guidelines and CFR Part 11 in all duties; strictly adhering to Lancaster Laboratories Software Development Lifecycle (SDLC) policies and procedures; preparing and executing software test plans for custom developed Laboratory Information Management System (LIMS) and other software in accordance with internal procedures; spending a large portion of time writing documentation in support of various software development stages and in accordance with SDLC procedures; spending some portion of time supporting and assisting users with new software applications; at times, conducting formal training sessions with a small group of users to familiarize them with a new computer system

Kenneth L. Boley, Jr., B.S., Senior Chemist Group Leader, GC/MS Volatiles

Education:

B.S. Chemistry, Messiah College (1995)

Professional Experience:

Heritage Custom Kitchens, Inc., Face Frame Assembler (1997–2001)
Responsibilities included reading and interpreting job orders; overseeing daily production of department; performing various manufacturing duties daily; member of the safety committee, first aid team, and security team
With Lancaster Laboratories since 2001
Chemist, GC/MS Volatiles (2001)
Responsibilities included analyzing samples and QC by purge and trap GC/MS; generating and reviewing raw data; performing maintenance on GC/MS, purge and traps, and various autosamplers; following methods and SOPs
Senior Chemist, GC/MS Volatiles (2005)
Responsibilities included performing routine and non-routine analyses; diagnosing and solving technical problems; maintaining and troubleshooting instrumentation; writing and revising SOPs; training new analysts; auditing and uploading data as work load deems necessary

Senior Chemist Group Leader, GC/MS Volatiles (2009)

Responsibilities include maintaining GC/MS instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing corrective action and system improvements when necessary; performing all duties with minimal supervision; working on special assignments; diagnosing complex problems and offering solutions with a high degree of independence; assisting in "brainstorming" client problems and projects; completing assigned projects on time; researching new and emerging technologies; producing written and oral reports on research activities; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow

Nancy J. Bornholm, B.S., Principal Specialist, Environmental Client Services

Education:

B.S. Chemistry (magna cum laude), Muhlenberg College (1981)

Continuing Education:

Instrumental Analysis of Paints and Polymers, FBI Academy (1984)
Analytical Chemistry of Contaminants in Surface and Groundwater, ACS Short Course (1986)

Professional Experience:

University of Connecticut Health Center, Laboratory Technician (1977-1980)
Institute for Cancer Research, Research Technician (1981)
Baltimore City Crime Laboratory, Mobile Crime Unit Trainee (1981-1982)
Maryland State Police Crime Laboratory, Forensic Chemist III (1982-1985)
With Lancaster Laboratories since 1985

Senior Specialist, Environmental Client Services (1987)

Responsibilities included project management; audit sample entries; answer client questions; communicate client requirements to lab areas; and schedule sample submissions and provide sampling containers

Principal Specialist, Environmental Client Services (2004)

Responsibilities include performing project management for large clients/projects; auditing sample entries for accuracy; providing price quotes; answering client questions; understanding and communicating client requirements to lab personnel; scheduling sample submissions; ordering sampling containers and providing pre-printed COCs; serving as a technical resource to both internal and external clients and notifying management of any client issues

Awards, Citations, Honorary Societies, and Publications:

Quarterly Impact Award (2008)
Superlative Service President's Award (2008)

Rachel A. Brady, B.S., Senior Specialist Group Leader, Safety

Education:

B.S. Environmental Biology, Millersville University (2002)

Professional Experience:

TIER Environmental, Lab Pack Chemist (2005-2006)

Responsibilities included preparing shipments/paperwork for hazardous/residual waste disposal

Clean Harbors, InSite Supervisor (2010-2014)

Responsibilities included overseeing Hazardous Waste disposal program; all residual waste; waste water treatment plant operations

With Eurofins Lancaster Laboratories since 2014

Specialist, Safety (2014)

Responsibilities included implementing and performing hazardous, biologic, and chemotherapeutic waste removal

Senior Specialist, Safety (2015)

Responsibilities include overseeing waste team; RSO; oversee all Environmental Programs

Marla S. Brewer, B.S., Senior Specialist, GC/MS Volatiles

Education:

B.S. Industrial Hygiene, Purdue University (2000)

Continuing Education:

OSHA 8-Hour (2000)
Comprehensive GC/MS Seminar, Restek (2002)
Practical Process Improvement Facilitator Training (2010)

Professional Experience:

ALCOA, Industrial Hygiene Intern (1999)

Responsibilities included performing air sampling for a variety of substances; conducting noise survey including area and personal sampling; testing plant environment for heat stress and evaluated reports; assisting in formulation of written program

BP-Amoco Refinery/Orr Professional Services, Industrial Hygiene Technician (2000)

Responsibilities included performing air sampling to reevaluate Benzene Exposure Surveillance Program; conducting noise surveys including area and personal monitoring to reevaluate Hearing Conservation Program

With Eurofins Lancaster Laboratories since 2000

Senior Technician, Volatiles by GC (2000)

Responsibilities included performing prescreen analysis, sample prep, GC maintenance, and data review

Chemist, GC/MS Volatiles (2001)

Responsibilities included analyzing samples and QC by purge and trap GC/MS; generating and reviewing raw data; performing maintenance on GC/MS, purge and traps, and various autosamplers

Senior Specialist, GC/MS Volatiles (2006)

Responsibilities include performing GC/MS volatile data interpretation; reviewing and approving data; signing reports; analyzing samples; generating raw data; sample verification; SOP revisions and updates

Jamie L. Brillhart, B.S., Senior Chemist, Pesticide Residue Analysis

Education:

B.S. Physical Science, York College of Pennsylvania (2003)

Professional Experience:

B-H Laboratories Inc./Analytical Laboratory Services Inc., Inorganic Laboratory Technician/Inorganic Chemist (2003-2005)

Responsibilities included performing wet chemistry testing on drinking waters and waste water; being responsible for analyses included fluoride, cyanide, phosphorus, nitrate/nitrite, cadmium reduction, and grease and oil testing when needed; prepping and analyzing for mercury on a mercury analyzer; analyzing for various metals on a graphite furnace; prepping leachates; prepping standards as needed

Hercon Laboratories, Inc., QC Analyst I (2005-2007)

Responsibilities included performing Quality Control Testing on Transdermal Systems; performing assays, dissolutions, degradation, residual solvents, and raw material testing; prepping necessary standards and performing instrument maintenance as needed

With Lancaster Laboratories since 2007

Chemist, Pesticide Residue Analysis (2007)

Responsibilities included analyzing soils for PPL Pesticides using 5890 and 6890 GCs with ECD detectors; performing instrument maintenance; prepping standards; auditing calibrations as necessary; being able to analyze for OPPAs, ACMOs, EDBs, PCBs, and Herbicides as needed

Senior Chemist, Pesticide Residue Analysis (2011)

Responsibilities include analyzing soils for PPL Pesticides using 5890 and 6890 GCs with ECD detectors; performing instrument maintenance; prepping standards; auditing calibrations as necessary; being able to analyze for OPPAs, ACMOs, EDBs, PCBs, and Herbicides as needed

Marianne L. Bragg, B.S., Principal Specialist, Business Development, Environmental Sciences

Education:

B.S. Biology, Millersville University (1987)

Professional Experience:

With Eurofins Lancaster Laboratories since 1985

Coordinator

Group Leader (1990)

Principal Specialist (1994)

Responsibilities included advising clients on testing; providing price quotes and proposals; answering client questions; scheduling sample submissions and providing sampling containers; communicating client requirements to lab areas; assisting with client visits to the lab

Principal Specialist/Coordinator, Environmental Business Development (2002)

In addition to the responsibilities listed above, manage workload and workflow among business development staff

Principal Specialist/Group Leader, Environmental Business Development (2005)

In addition to the responsibilities listed above, manage workload and workflow among business development staff

Principal Specialist, Environmental Business Development (2007)

Responsibilities included advising clients on testing; providing price quotes and proposals; answering client questions; scheduling sample submissions and providing sampling containers; communicating client requirements to lab areas; assisting with client visits to the lab

Principal Specialist, Business Development, Environmental Sciences (2014)

Responsibilities include independently securing new business consistent with operational capabilities and business plan goals; collaborating efforts and activities with those of Outside Sales account managers as needed; focusing on proposal writing for major national accounts; attending face-to-face sales meetings with selected national accounts as needed and maintaining responsibility for their maintenance and growth

Robert Brown, Principal Chemist, Specialty Services Group

Education:

Attended 2.5 years at Pennsylvania State University towards B.S. in Microbiology (1988)

Completed 20 credits towards B.S. in Environmental Biology, Millersville University (1993)

Professional Experience:

With Eurofins Lancaster Laboratories since 1988

Chemist (1993)

Senior Chemist (1997)

Responsibilities included performing extractable petroleum testing; operating multiple Hewlett-Packard gas chromatograph (GC) instruments; data interpretation and entry; developing and evaluating new methods

Principal Chemist (2004)

Responsibilities included performing extractable petroleum testing; operating multiple Hewlett-Packard gas chromatograph (GC) instruments; data interpretation and entry; developing and evaluating new methods; serving as primary technical contact for client service representatives and their clients

Principal Chemist Group Leader, EPH/Misc. GC (2005)

Responsibilities included performing extractable petroleum testing; operating multiple Hewlett-Packard gas chromatograph (GC) instruments; data interpretation and entry; developing and evaluating new methods; serving as primary technical contact for client service representatives and their clients

Principal Chemist, Specialty Services Group (2011)

Responsibilities include: acting as technical resource within the environmental division; developing and validating analytical protocols; troubleshooting and solving analytical chemistry problems; optimizing instrument configuration and performance; evaluating and interpreting analytical results; writing SOPs; assisting in responding to and eliminating ICARs, assisting in optimizing procedures in prep lab; communicating effectively within department; performing routine work as required

Kathryn A. Brungard, Senior Specialist, Environmental Quality Assurance

Continuing Education:

Clinical Laboratory Science, Temple University (1984-1988)

Professional Experience:

Environmental Partners, Inc., Environmental Technician/Health and Safety Coordinator (2003-2005)

Responsibilities included determining personnel health and safety risks on each work site and determining appropriate measures to be taken for personal protection; maintaining and servicing sampling equipment; calibrating meters and analytical equipment; collecting and processing representative samples at each monitoring site following state mandated procedures; routinely measuring field water and soil quality parameters; performing product recovery as part of site remedial measures; evaluating and reporting upon trends and/or results that were out-of-range

Maxwell House Coffee/Kraft Foods, Quality Assurance Technician (2004-2005)

Responsibilities included conducting hourly audits on operating production lines which included weight of product, oxygen content, density, caffeine level by HPLC, moisture content, inspection for foreign or incidental materials, and packaging compliance; performing weekly water testing for level of chlorine and microbial contamination; producing result spreadsheets and accurate logs; notifying upper management of all results in a timely manner

Columbia Analytical Services, Inc, Quality Assurance Program Manager (2005-2009)

Responsibilities included being responsible for the overall coordination of the NELAP certified environmental laboratory program; monitoring laboratory quality systems through audits; identifying potential problem areas, recommending corrective actions, and providing technical assistance and training as necessary; informing management of potential problems and recommending remedial measures in a timely basis both orally and by written communication; maintaining performance evaluation records; maintaining accreditations for regulatory agencies and client programs; providing audit responses and initiating changes in procedures; maintaining the calibration of all weights, balances, and thermometers

With Eurofins Lancaster Laboratories since 2010

Senior Specialist, Environmental Quality Assurance (2010)

Responsibilities include ensuring quality of data being produced in the laboratories by performing data review, auditing laboratories, and reviewing written procedures; ensuring laboratory adherence to government regulations and client requirements; reviewing client and government documents for requirements outside our usual laboratory practices; setting up and testing new analysis in the laboratory sample management system as required by the departments

Memberships and Appointments:

Florida Society of Environmental Analysts (2005-2009)
Society of Women Environmental Professionals, SWEP (2012-present)

Rachel R. Cochis, B.A., Principal Specialist Group Leader, GC/MS Semivolatiles

Education:

B.A. Science, Pennsylvania State University (1992)

Continuing Education:

Introduction to Mass Spec Interpretation, Hewlett-Packard (1995)
Gas Chromatography Principles & Practices (1994)

Professional Experience:

With Eurofins Lancaster Laboratories since 1993

Chemist (1994), GC/MS Semivolatiles (1993)

Responsibilities included performing semvolatiles analysis on water and soil samples

Senior Chemist Coordinator, GC/MS Semivolatiles (1996)

Responsibilities included scheduling lab work; performing data interpretation and entry; reviewing and approving data; revising and updating SOPs and analytical methods; monitoring turnaround time; communicating client requirements to lab areas

Senior Specialist Group Leader, GC/MS Semivolatiles (2005)

Responsibilities included scheduling lab work; performing data interpretation and entry; reviewing and approving data; revising and updating SOPs and analytical methods; monitoring turnaround time; communicating client requirements to lab areas

Principal Specialist Group Leader, GC/MS Semivolatiles (2013)

Responsibilities include scheduling lab work; performing data interpretation and entry; reviewing and approving data; revising and updating SOPs and analytical methods; monitoring turnaround time; communicating client requirements to lab areas

Tracy A. Cole, Senior Specialist, EPH/Miscellaneous GC

Continuing Education:
- Gas Chromatography: Principles and Practice, LLU (1997)

Professional Experience:
- With Lancaster Laboratories since 1991
  - Laboratory Technician, Volatiles in Air (1991)
    - Responsibilities included preparing samples and standards; washing glassware; loading samples on instruments
  - Senior Technician, Volatiles in Air and EPH/Miscellaneous GC (1994)
    - Responsibilities included analyzing routine samples and QC by Gas Chromatography for DRO and miscellaneous organic compounds; preparing direct injection samples for analysis; preparing standards; reviewing chromatography data and uploading to the LIMS
  - Chemist, EPH/Miscellaneous GC (1999)
    - Responsibilities included analyzing routine and nonroutine samples and QC by Gas Chromatography for various organic analyses including DRO, TPH, and other petroleum related methods and miscellaneous organic compounds by direct injection; reviewing chromatography data and uploading to the LIMS; performing instrument maintenance; calibrating instruments for various methods
  - Senior Specialist, EPH/Miscellaneous GC (2008)
    - Responsibilities include reviewing/verifying data for technical correctness including raw chromatography data, initial calibrations, and analytical reports; ensuring that method and project requirements were followed and entry into the LIMS is correct; acting as a technical resource for the department; assisting in reviewing/writing SOPs and other technical documents

Paul R. Cormier, B.A., Principal Specialist, Specialty Services Group

Education:
- B.S. Microbiology, Virginia Tech (1984)
- B.A. Chemistry, Virginia Tech (1984)

Continuing Education:
- Hewlett-Packard GC/MS Advance Operations/System Manager Course (1990)
- Mass Spectral Interpretation, Finnigan MAT Institute (1991)
- Technical Training, OI Analytical (1995)

Professional Experiences:
- Environmental Testing & Certification (1985-1989)
- Analytikem, Inc. (1989-1990)
- With Lancaster Laboratories since 1990
  - Senior Chemist (1990)
    - Responsibilities included: operate GC/MS instruments; data interpretation; review and approve data; repairing instruments; and train other analysts.
  - Senior Specialist (2005)
    - Responsibilities included: operate GC/MS instruments; data interpretation; review and approve data; repairing instruments; and train other analysts.
  - Principal Specialist, GC/MS Volatiles (2006)
    - Responsibilities include: operate GC/MS instruments; data interpretation; review and approve data; repairing instruments; and train other analysts.
  - Principal Specialist, Specialty Services Group (2010)
    - Responsibilities include acting as technical resource within the environmental division; developing and validating analytical protocols; troubleshooting and solving analytical chemistry problems; optimizing instrument configuration and performance; evaluating and interpreting analytical results; writing SOPs; assisting in responding to and eliminating ICARs, assisting in optimizing procedures in prep lab; communicating effectively within department; performing routine work as required

Memberships & Appointments:
- American Chemical Society

Teresa L. Cunningham, B.S., Principal Specialist, Environmental Client Services and Inside Business Development

Education:

B.S. Biology, St. Joseph's University (1999)

Continuing Education:

Chemical Monitoring Assistance Program, Pennsylvania Rural Water Association (2000)
How to Deliver Exceptional Customer Service, Fred Pryor Seminars (2000)
Organizational Behavior, Penn State University (2005)

Professional Experience:

With Eurofins Lancaster Laboratories since 1999

Specialist, Environmental Client Services (1999-2000)
Senior Specialist, Environmental Client Services (2001)
Senior Specialist Coordinator, Environmental Client Services (2001)

Responsibilities included serving as project manager for clients with petroleum-related testing accounts; coordinating client requests with laboratory groups to ensure that the client's needs are met; scheduling bottle shipments and sample pickups; preparing quotations; coordinating staff

Senior Specialist Group Leader, Environmental Client Services (2005)

Responsibilities included serving as project manager for clients with petroleum-related testing accounts; coordinating client requests with laboratory groups to ensure that the client's needs are met; scheduling bottle shipments and sample pickups; preparing quotations; coordinating staff

Manager, Environmental Client Services (2006)

Responsibilities included overseeing implementation of new projects; coordinating client requests with laboratory groups to ensure that the client's needs are met; coordinating staff

Principal Specialist, Environmental Client Services and Inside Business Development (2008)

Responsibilities include performing project management; training new client service representatives; auditing sample entry; answering client questions; communicating client requirements to lab areas

Carolyn M. Cyms, B.S., Senior Specialist Group Leader, Environmental Sample Administration

Education:

B.S. Secondary Education/Chemistry, Bloomsburg University of Pennsylvania (1993)
Post Baccalaureate Certificate, Biology and MS Math, Millersville University (2002)

Continuing Education:

Accounting I, HACC (1996)
Introduction to the Internet, PC Focus (1996)
Self-Discipline & Emotional Control, Franklin-Covey (1997)
Child Growth & Development, HACC (1998)
Cell Biology, Millersville University (2000)
Botany; Genetics; Zoology; Biochemistry; Ecology, and Ecology Lab, Millersville University (2001)
Immunology; Animal Behavior; Teaching Biological Issues; Entomology, Millersville University (2002)
Introduction to Computer Programming, Millersville University (2003)

Professional Experience:

Lancaster Theological Seminary, Field Education Assistant-Special Project Coordinator (1996-1999)

Responsibilities included assisting with mailings, organization of the field education program; creating and preparing a student field education manual for the ministerial studies program; acting as liaison between Field Ed Professor, Field Ed sites, and students; preparing all written correspondences for the field ed office; organizing and preparing materials for meetings; tracking student progress through the program; assisting with other special projects requiring computer skills of PageMaker, WordPerfect, Quattro Pro, and Envoy

Self-Employed, Tutor (1994-2005)

Responsibilities included tutoring HACC students in Introduction to Chemistry, Chemistry, Biology, and Algebra

Millersville University – Biology Department, Assistant (2003)

Responsibilities included preparing Power Point presentations for a stream restoration monitoring program; photographing various stages of the project

With Lancaster Laboratories since 1994

Administrator III, Environmental Sample Administration (1994)

Responsibilities included receiving samples, entering samples, auditing, filing, noting discrepancies, and unpacking samples

Administrator III/Coordinator, Environmental Sample Administration (1995)

Responsibilities included relaying technical/client information when it became available; answering questions from clients/technical areas when CSR was unavailable; coordinating/prioritizing entry; supervising and evaluating work of 2nd Shift Environmental Entry Staff; training new personnel in the entry/interpretation process; preparing Job Plans on an as-needed basis

Specialist I, Environmental Sample Administration (1996)
Responsibilities included receiving samples; entering samples; auditing; filing; noting discrepancies; unpacking samples; acting as project coordinator on an as-needed basis
Senior Specialist, Environmental Sample Administration (2000)
Responsibilities included receiving samples; entering samples; auditing; filing; noting discrepancies; unpacking samples; acting as project coordinator on an as-needed basis; training; preparing resource materials; working on special projects as needed
Senior Specialist Coordinator, Environmental Sample Administration (2004)
Responsibilities included receiving samples; entering samples; auditing; filing; noting discrepancies; unpacking samples; acting as project coordinator on an as-needed basis; training; preparing resource materials; working on special projects as needed
Senior Specialist Group Leader, Environmental Sample Administration (2005)
Responsibilities include receiving samples; entering samples; auditing; filing; noting discrepancies; unpacking samples; acting as project coordinator on an as-needed basis; training; preparing resource materials; working on special projects as needed

Awards, Citations, Honorary Societies & Publications:
Residential Life Award of Merit (1990)
Bloomsburg University Dean's List 6 of 8 semesters, graduated cum laude (1990-1993)
Kappa Delta Phi (National Co-Ed Honor Society) (1994)
Spirit of LLI (2001)

Memberships & Appointments:
Elizabethtown Fire Company (1993-present)
Safety Committee (1994-1998)
Alpha Phi Omega (National Co-Ed Service Fraternity) (1991-1993)
NSTA (2000-2008)
Kappa Delta Phi (1994, 2001-2003)

Steven C. Davies, B.S., Manager, Transportation and Sample Bottles

Education:
B.S. Elementary Education, Lancaster Bible College (1987)

Professional Experience:
With Lancaster Laboratories since 1990
Transportation Coordinator (1991)
Transportation Group Leader (1994)
Transportation and Sample Bottles Group Leader (1998)
Responsibilities included supervise personnel; schedule lab work; manage financial resources; answer client questions; communicate client requirements to lab areas; and schedule sample submissions and provide sampling containers.
Transportation and Sample Bottles Manager (2005)
Responsibilities include supervise personnel; schedule lab work; manage financial resources; answer client questions; communicate client requirements to lab areas; and schedule sample submissions and provide sampling containers.

Lindsay C. Deibler-Wallace, M.S., Senior Specialist Group Leader, Training

Education:
B.S. Chemistry, Lebanon Valley College (2002)
M.S. Secondary Science Education, George Mason University (2007)

Professional Experience:
Flint Hill School, Upper School Science Teacher (2002-2013)
Responsibilities included developing and implementing rigorous lessons, laboratory activities and assessments for Physics, Chemistry and Honors Chemistry; created video podcasts for all Chemistry lecture material that students study outside of class time according to the Flipped Learning style; proposed and developed the curriculum to teach a new elective course in Forensic Science; utilized various computer resources to promote interactive learning and to prepare students for future workforce by encouraging group work, problem solving, and critical thinking; differentiated instruction and customized instructional strategies to ensure that all students achieve at high levels; provided a safe and engaging learning environment that encourages student success; analyzed data from formal and informal assessments to improve instruction; chaired bi-weekly grade level faculty meetings
With Eurofins Lancaster Laboratories since 2014
Senior Specialist, Training (2014)
Responsibilities included facilitating Core and Elective training for new employees; conducting orientations, internal courses, and other learning experiences
Senior Specialist Group Leader, Training (2015)
Responsibilities include managing the resources of the technical training group; designing and delivering core and elective technical training

Christine M. Dulaney, B.A., Senior Specialist, GC/MS Volatiles

Education:

B.A. Biology, Meredith College (1984)

Continuing Education:

Waters Fundamentals of HPLC, Compuchem Laboratories (1989)

Professional Experience:

Compuchem Laboratories (1984-1998)
- Extraction Technician (1984-1986)
  - Responsibilities included performing extraction of various environmental matrices for pesticide GC analysis and semivolatile GC/MS analysis; extracting quarterly PE samples
- GC Technician (1986-1989)
  - Responsibilities included performing analysis of environmental extracts for pesticides, PAHs, and volatile organic compounds using GC, HPLC, and purge and trap, respectively; performing routine instrument maintenance
- Senior Chemist, Pesticide Review (1990-1995, 1996-1998)
  - Responsibilities included performing qualitative and quantitative review of pesticide, PAH, and volatile organic data; reviewing instrument maintenance and standard logbooks

With Eurofins Lancaster Laboratories since 1998
- Chemist, Pesticide Residue (1998)
  - Responsibilities included reviewing GC pesticide residue data packages; responding to client inquiries and ICARs
- Project Management Specialist, Pharmaceutical Client Services (2003)
  - Responsibilities included managing details of various pharmaceutical client accounts using the laboratory information management system; acting as liaison between the client and internal laboratory personnel
- Senior Specialist, GC/MS Volatiles (2005)
  - Responsibilities include auditing data for various GC and GC/MS volatile analyses; verifying data within the laboratory information management system, communicating and following up on outstanding data issues

Eric L. Eby, B.S., Senior Chemist, Metals

Education:

B.S. Biology, Millersville University (1988)

Continuing Education:

OSHA 40-hour Hazardous Waste Management, Phoenix Safety Associates (1991)
DX500 Maintenance and Troubleshooting, Dionex (1996)
The Chemistry Behind the Techniques, EAS, Inc. (1996)
Cleaning Validation Strategies, Applied Analytical Industries, Inc. (1997)
Gas Chromatography Practical Theory and Applications, Lancaster Laboratories (1998)

Professional Experience:

With Lancaster Laboratories since 1988
- Associate Chemist (1993)
  - Responsibilities included environmental wet chemistry testing and field sampling.
- Chemist (1997)
- Senior Chemist, Pharmaceutical Raw Materials (1998)
  - Responsibilities included IC, TOC analysis, IC maintenance, USP purified water testing, raw materials testing, USP <661> container closure testing.
- Senior Chemist, Pharmaceutical Product Testing (2000)
  - Responsibilities included pharmaceutical product testing per client specific methods, IC and HPLC maintenance.
- Senior Chemist, Metals (2005)
  - Responsibilities include ICP analysis for environmental testing and ICP instrument maintenance.

Joseph S. Feister, Senior Chemist Group Leader, Organic Extraction

Professional Experience:

- With Eurofins Lancaster Laboratories since 1993
  - Laboratory Technician, Pesticide Residue Analysis (1993)
    - Responsibilities included prepping samples
  - Senior Technician, Organic Extraction (1996)
    - Responsibilities included prepping samples
  - Chemist Group Leader, Organic Extraction (2001)
    - Responsibilities included prepping samples; supervising employees
  - Senior Chemist Group Leader, Organic Extraction (2015)
    - Responsibilities include performing high level, difficult preps (with minimal supervision or guidance) following standard operating procedures (SOPs); self-train in new techniques; entering information into computer; training new or existing employees in extraction techniques or use of equipment; using knowledge to actively improve current processes; developing, enhancing, and validating new extraction methods; keeping work area clean and organized; preparing spikes; repairing equipment; updating departmental SOPs and training manual; disposing of wastes in approved manner; assisting in incident prevention and remediation when necessary; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow

Erik J. Frederiksen, B.A., Manager, Water Quality and Instrumental Water Quality

Education:

- B.A. Chemistry, University of Virginia (1990)

Continuing Education:

- Infrared Spectral Interpretation (1993)

Professional Experience:

- With Eurofins Lancaster Laboratories since 1990
  - Chemist/Coordinator (1993)
  - Group Leader, Water Quality Department (1994)
    - Responsibilities included supervising personnel; managing laboratory operations; project management; managing financial resources; reviewing and approving data
  - Manager, Water Quality and Instrumental Water Quality Departments (2005)
    - Responsibilities include supervising personnel; managing laboratory operations; project management; managing financial resources; reviewing and approving data

Lynn Frederiksen, B.S., Principal Specialist, Environmental Client Services

Education:

- B.S. Conservation and Resource Development, University of Maryland (1981)

Professional Experience:

- University of Missouri, Senior Research Lab Technician (1982 – 1984)
- GPU Nuclear Corporation, Data Analyst (1985 – 1989)
- With Eurofins Lancaster Laboratories since 1989
  - Senior Specialist (1989)/Team Leader, Environmental Client Services (2006)
    - Responsibilities included: consult with clients regarding testing needs; revise and update SOPs; provide price quotes; audit sample entry; answer client questions; communicate client requirements to lab areas; provide status reports, including results, to clients; schedule sample submissions and provide sampling containers; assist Group Leader with training of new employees and delegating new projects.
  - Senior Specialist Group Leader, Environmental Client Services (2007)
    - Responsibilities included: managing a team of client service representatives, training of new employees, setting up and delegating new projects, serving as primary project manager for several large petroleum clients and consultants.
  - Principal Specialist Group Leader, Environmental Client Services (2011)
    - Responsibilities included serving as the primary contact or back-up with the laboratory for a number of assigned clients requiring specialized testing or complex projects; understanding and communicating technical information and client requirements to laboratory personnel, helping to ensure that requirements are met; leading broad-based complex projects to a satisfactory conclusion according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales; advising and training other members of the department; serving as a technical resource both internally and externally; proactively assisting Outside Business Development with client visits, presentations, and internal audits for assigned clients; participating on PPI teams

Principal Specialist, Environmental Client Services (2015)

Responsibilities include serving as the primary contact or back-up with the laboratory for a number of assigned clients requiring specialized testing or complex projects; understanding and communicating technical information and client requirements to laboratory personnel, helping to ensure that requirements are met; leading broad-based complex projects to a satisfactory conclusion according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales; advising and training other members of the department; serving as a technical resource both internally and externally; proactively assisting Outside Business Development with client visits, presentations, and internal audits for assigned clients; participating on PPI teams

Joseph M. Gambler, B.S., Principal Chemist, GC/MS Semivolatiles

Education:

B.S. Chemistry, Millersville University (1996)

Professional Experience:

Wyeth, Biological Manufacturing Technician (1996)

With Eurofins Lancaster Laboratories since 1996

Senior Chemist, GC/MS Semivolatiles (1996)

Responsibilities included training new hires; maintaining GC/MS systems; preparing standards/stocks/spikes; maintaining Helium supply system; performing data interpretation; ordering supplies; auditing; cross trained in Pesticides Department

Principal Chemist, GC/MS Semivolatiles (2015)

Responsibilities include maintaining GC/MS instrumentation; tuning and calibrating instruments daily; analyzing quality control and client samples; reviewing and assembling this data in an efficient manner with a high degree of quality to meet client requirements; working on special projects, research, or IT needs for the group (at the direction of Group Leader or Manager) with little or no supervision

Stephen J. Gordon, B.S., Project Manager, Pittsburgh Service Center

Education:

B.S. Chemistry, Carnegie Mellon University (1996)

Professional Experience:

Alcoa, Inc, Senior Technician (1997-2000)

Responsibilities included analytical chemist specialized in PCB congener analysis by GC-ECD

Clark Laboratories, LLC, Project Manager (2000-2012)

Responsibilities included managing ASTM D02 interlaboratory crosscheck program and working as an analytical chemist

Environmental Data Services, Senior Technical Specialist (2012-2015)

Responsibilities included data validation, laboratory auditing, technical writing

With Eurofins Lancaster Laboratories since 2015

Project Manager, Pittsburgh Service Center (2015)

Responsibilities include serving as the primary contact for a number of assigned clients; understanding technical information and communicating client requirements to laboratory personnel; helping to ensure that requirements are met; managing large/complex projects according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales; training subordinates; delegating routine tasks; resolving issues when problems arise; participating in departmental process improvement; packing bottle orders and delivering bottles/picking up samples as needed

Susan M. Goshert, B.S., Manager, EPH/Miscellaneous GC, Pesticide Residue Analysis, Nitrosamines

Education:
B.S. Chemistry, Juniata College (1988)

Continuing Education:
Advanced Aquarius Report Training, Hewlett-Packard (1989)
How to Handle People with Tact and Skill, Harrisburg Area Community College (1992)
Positive Attitude and Peak Performance, Harrisburg Area Community College (1992)

Professional Experience:
With Lancaster Laboratories since 1988
Chemist (1990)
Senior Chemist Coordinator (1997)
Responsibilities included supervising personnel; reviewing and approving data; monitoring turnaround time
Senior Specialist Group Leader, EPH/Misc. GC (2005)
Responsibilities included supervising personnel; reviewing and approving data; monitoring turnaround time
Principal Specialist Group Leader, GC/MS Volatiles (2008)
Responsibilities included supervising personnel; reviewing and approving data; monitoring turnaround time
Manager, EPH/Miscellaneous GC, Pesticide Residue Analysis, Nitrosamines (2012)
Responsibilities include supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Brian K. Graham, B.A., Senior Chemist, GC/MS Semivolatiles

Education:
B.A. Mathematics, Millersville University (1996)

Professional Experience:
With Lancaster Laboratories since 1989
Chemist, GC/MS Semivolatiles (1989-2006)
Senior Chemist, GC/MS Semivolatiles (2006)
Responsibilities include maintaining GC/MS Instrumentation; tuning and calibrating GC/MS; analyzing samples by GC/MS; reviewing and assembling all supporting GC/MS data; preparing standards for calibrations; training new analysts

Nina C. Haller, Senior Specialist Group Leader, Metals

Continuing Education:
State Dairy Lab Cert., State of PA (1993)
Butterfat Testing License, State of PA (1995)
Seminar ICP/ICPMS, Fisons Instruments (1995)
Three-day ICP Trace Training Course, Thermo Jarrell Ash, MA (1996)

Professional Experience:
Hazelton Research Products, Lab Technician (1981-1984)
Responsibilities included rabbit production facility, removal of ovaries, care, and maintenance
With Lancaster Laboratories since 1987
Technical Associate, Foods (1987)
Responsibilities included coordinating Listeria Testing Program; performing data entry and verification
Chemist, Metals (1993)
Responsibilities included performing daily tracking of rushes; operating and maintaining ICP instrumentation; reviewing and verifying of ICP data, data package review
Specialist Group Leader, Metals (2003)
Responsibilities included overseeing the ICP/ICPMS personnel and instrumentation workflow; verifying ICP/ICPMS/GFAA/Hg data
Senior Specialist Group Leader, Metals (2006)
Responsibilities included overseeing the ICP/ICPMS personnel and instrumentation workflow; verifying ICP/ICPMS/GFAA/Hg data
Senior Specialist Group Leader, Metals (2007)
Responsibilities include overseeing metals instrument and verification personnel and instrumentation workflow; verifying metals data

Michele D. Hamilton, B.S., Senior Chemist Group Leader, EPH/Misc. GC

Education:
- B.S. Chemistry, Temple University (1990)

Continuing Education:
- Gas Chromatography: Practical Theory and Applications for LL (1993)
- Practice of Modern HPLC, LC Resources (1996)

Professional Experience:
- With Eurofins Lancaster Laboratories since 1991
  - Senior Chemist (1997)
  - Senior Chemist Coordinator (2000)
    - Responsibilities included supervising personnel; coaching and developing new employees; sample tracking; reviewing rush request; communicating client requirements; operating GC and HPLC instruments; data interpretation and entry; calibrating; repairing instruments and verifying data
  - Senior Chemist Group Leader, Pesticide Residue Analysis (2005)
    - Responsibilities included supervising personnel; coaching and developing new employees; sample tracking; reviewing rush request; communicating client requirements; operating GC and HPLC instruments; data interpretation and entry; calibrating; repairing instruments and verifying data
  - Senior Chemist Group Leader, EPH Misc. GC (2011)
    - Responsibilities include supervising personnel; coaching and developing new employees; sample tracking; reviewing rush request; communicating client requirements; operating GC instruments; data interpretation and entry; calibrating; repairing instruments and verifying data

Linda M. Hartenstine, B.A., Senior Chemist, GC/MS Semivolatiles

Education:
- B.A. Chemistry, Millersville University (1994)

Professional Experience:
- With Lancaster Laboratories since 1994
  - Associate Chemist (1994)
  - Chemist (1997)
  - Senior Chemist, GC/MS Semivolatiles (1998)
    - Responsibilities include performing GC/MS semivolatiles testing; operating GC/MS instruments; data interpretation; developing and evaluating new methods; calibrating and repairing instruments; preparing standards; revising and updating SOPs and analytical methods; training other analysts

Robert G. Heisey, Jr., B.A., Senior Specialist, Water Quality

Education:
- B.A. Chemistry, Millersville State College (1972)

Professional Experience:
- RCA Corp., Engineering Technician (1972-1987)
- With Lancaster Laboratories since 1988
  - Chemist Coordinator (1989)
  - Senior Chemist Coordinator (1997)
    - Responsibilities included: supervise personnel; schedule lab work; review and approve data; develop and evaluate new methods; prepare test standards.
  - Senior Chemist Group Leader (2005)
    - Responsibilities included: supervise personnel; schedule lab work; review and approve data; develop and evaluate new methods; prepare test standards.
  - Senior Specialist, Water Quality (2006)
    - Responsibilities include: review and approve data; develop and evaluate new methods; prepare test standards; order laboratory supplies; maintain department's chemical inventory.

Daniel H. Heller, B.A., Senior Chemist, GC/MS Volatiles

Education:

A.S.T. Machine Technology, Stevens State College (1998)
B.A. Secondary Education Biology, Millersville University (2003)

Professional Experience:

Tyco Electronics, Machinist B (1998-2004)
Responsibilities included machining various materials using various machines
Columbia Junior/Senior High School, Teacher (2005)
Responsibilities included teaching 9th and 10th grade biology
Penn State Cooperative Extension, Biologist (2005-2006)
Responsibilities included treating and surveying mosquito populations
With Lancaster Laboratories since 2006
Chemist, GC/MS Volatiles (2006)
Responsibilities included evaluating water samples for volatiles using GC/MS instrumentation
Senior Chemist, GC/MS Volatiles (2012)
Responsibilities include evaluating water samples for volatiles using GC/MS instrumentation

Tamara J. Helsel, Senior Specialist Group Leader, Environmental Sample Administration

Professional Experience:

Willow Valley Retirement Communities, Certified Nursing Assistant (2000-2001)
Responsibilities included assisting nursing home residents with their daily activities and personal hygiene
Bayada Nurses, Certified Nursing Assistant (2000-2001)
Responsibilities included assisting people with disabilities in their homes with their personal hygiene and daily activities
With Eurofins Lancaster Laboratories since 2001
Senior Administrator, Environmental Sample Administration (2001)
Responsibilities included performing sample receipt, interpretation, and entry
Specialist, Environmental Sample Administration (2001)
Responsibilities included performing sample receipt, interpretation, and entry
Senior Specialist, Environmental Sample Administration (2007)
Responsibilities included performing sample receipt, interpretation, and entry
Senior Specialist Group Leader, Environmental Sample Administration (2013)
Responsibilities include performing sample receipt, interpretation, and entry

Memberships and Appointments:

Lancaster Laboratories Safety Committee (2003-2007)

Chadwick J. Hershey, B.S., Senior Specialist, Environmental Software Development

Education:

B.A. Economics, Millersville University (2001)
B.S. Computer Science, Millersville University (2001)

Continuing Education:

Mastering Microsoft Visual Basic 6 Development, IntelliMark (2001)
Oracle Exam #120-007, Introduction to Oracle 9i: SQL (2004)

Professional Experience:

With Eurofins Lancaster Laboratories since 1999
Intern, Computer Applications Development (1999-2001)
Responsibilities included maintaining and developing departmental computer systems
Specialist, Computer Applications Development (2001)
Responsibilities included maintaining and developing departmental computer systems
Senior Specialist, Environmental Software Development (2006)
Responsibilities include maintaining and developing departmental computer systems

Catherine M. Holt, B.S., Principal Specialist, Environmental Software Development

Education:

B.A. Mathematics, Franklin & Marshall College (1984)
B.S. Computer Science, Millersville University (1987)

Continuing Education:

Novell Network Seminar, Novell (1989)
Clarion Database Management Seminar, Clarion Software (1991)
Operations Process Optimization, Penn State University (1992)
Fast Track to Powerbuilder Seminar, Actium (1997)
Mastering Visual Basic 6 Development, Microsoft Corporation (1999)
Introduction to Oracle9I: SQL, Online Testing (2004)
Programming with the Microsoft .NET framework using Microsoft Visual Studio 2005 (2008)
Windows Forms 3.5 Programming for Experienced VB .NET Programmers (2010)

Professional Experience:

R.R. Donnelley & Sons Company, Technician (1985-1987)
Responsibilities included scanning and developing photographs for use in catalogs
Shared Medical Systems, Programmer (1987-1989)
Responsibilities included customizing and installing software at hospitals
With Eurofins Lancaster Laboratories since 1989
Principal Specialist, Computer Applications Development (1989)
Responsibilities included developing and maintaining computer systems/programs for laboratory use
Principal Specialist/Coordinator, Computer Applications Development (1995)
Responsibilities included supervising personnel; developing and maintaining computer systems/programs for lab use; communicating with clients about disk requirements
Principal Specialist, Environmental Software Development (1997)
Responsibilities include developing and maintaining computer systems in VB6 and VB.net for use within Parallax shell

Diana G. Holmes, M.S., Senior Specialist, Environmental Software Development

Education:

B.A. Physics, Cornell University (1983)
M.S. Computer Science, Rensselaer Polytechnic Institute (1985)

Professional Experience:

AT&T Bell Laboratories, Technical Staff Member (1985-1986)
Responsibilities included developing software for testing software
Prime Computer, Software Engineer II (1986-1988)
Responsibilities included designing, implementing, and testing software for PRIMOS and mini-supercomputers
Banyan Systems, Principal Software Engineer (1988-1999)
Responsibilities included developing, enhancing, and maintaining suite of services for VINES mail service; worked with 3rd party developers; third line customer support
Progressive Systems/Cobalt Networks, Senior Software Engineer (1999-2000)
Responsibilities included managing and leading software releases; designed and implemented software features; third line customer support
Sun Microsystems, Project Manager (2000-2005)
Responsibilities included project manager for Linux Operation System releases
Innovative Emergency Management, Inc., Applications Systems Engineer (2005-2006)
Responsibilities included providing system administration support, development of software tools for deployment
Pennington Biomedical Research Center, IT Applications Developer III (2006-2013)
Responsibilities included analyzing, designing, developing, executing, documenting, and supporting software applications for the Basic Science labs
With Eurofins Lancaster Laboratories since 2013
Senior Specialist, Environmental Software Development (2013)
Responsibilities include providing technical support for maintenance of installed software applications and assistance with development, installation, and maintenance of new applications for general use; assistance in development, implementation, and maintenance of software intended to improve quality and efficiency of work performed

Kay G. Hower, B.S., Manager, ELLE Service Centers

Education:

B.S. Animal Science, University of Delaware (1988)

Professional Experience:

U.S. Fish and Wildlife Service, Research Assistant (1990-1991)
RMC Environmental Services, Biological Technician (1992-1994)
Lancaster Laboratories

Senior Specialist, Project Manager, Environmental Client Services (1994-2001)

Responsibilities included managing client projects; auditing sample entry; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions and providing sampling containers.

Principal Specialist, Environmental Business Development (2001-2007)

Responsibilities included providing price quotes and proposals; advising clients on testing; assisting on client visits/audits; answering client questions; communicating client requirements to lab areas

Principal Specialist, Pharmaceutical Client Services (2007-2008)

Responsibilities included acting as the pharmaceutical client liaison within the laboratory by communicating client's requirements to the technical staff by maintaining project-related documentation, communicating desired turnaround times, and managing information flow; other duties include facilitating and organizing client audits, visits, and conference calls; monitoring ongoing projects and providing status updates as needed; auditing client sample paperwork and resolving discrepancies; overseeing the general administration of pharmaceutical projects (issuing quotations, answering billing and reporting questions, and scheduling sample pickups)

Urological Associates of Lancaster, Surgical Coordinator (2010-2012)

Responsibilities included coordinating surgical procedures for seven urologists at four facilities; meeting with patients to explain procedure details including pre-hospital testing, day-of timeline and post-op appointments and testing; obtaining insurance authorizations

With Eurofins Lancaster Laboratories since 2012

Principal Specialist Group Leader, Bay Area Service Center (2012)

Responsibilities included serving as the primary contact with the laboratory for a number of assigned clients; communicating technical information and conveying client requirements to laboratory personnel, ensuring that those requirements are met; managing large/complex projects according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow

Manager, ELLE Service Centers (2014)

Responsibilities include overseeing all managerial operations of the service centers; managing the service centers in an efficient and financially sound manner; providing leadership and coaching to assigned individuals; participating in long-term and short-term planning and goal-setting for the group; coordinating functions and responsibilities of assigned department members to provide consistent service; relaying corporate information appropriately; traveling to existing service centers on a quarterly basis and assisting in set-up and training as new centers are opened; serving as the primary contact with the laboratory for assigned clients; communicating technical information and conveying client requirements to laboratory personnel

Sara E. Johnson, B.S., Senior Chemist, GC/MS Volatiles

Education:

B.S. Chemistry, Biochemistry option, Millersville University (2006)

Professional Experience:

With Lancaster Laboratories since 2006

Chemist, Flexible Staffing (2006)

Responsibilities included flexing to various departments as needed and performing analysis ranging from GC/MS to SDS-PAGE Electrophoresis with colloidal blue or silver staining

Chemist, GC/MS Volatiles (2008)

Responsibilities included performing GC/MS analysis of water and soil samples along with other matrices by various analytical methods such as EPA 624, 8260B, and CLP; evaluating analytical data generated; calibrating and troubleshooting GC/MS instrumentation

Senior Chemist, GC/MS Volatiles (2010)

Responsibilities include performing GC/MS analysis of water and soil samples along with other matrices by various analytical methods such as EPA 624, 8260B, and CLP; evaluating analytical data generated; calibrating and troubleshooting GC/MS instrumentation; assisting other employees with any questions that may arise and helping to train new employees

Laura A. Jovanovic, B.A., Principal Specialist Account Manager, Environmental Business Development/Sales

Education:

B.A. History/Russian, Indiana University (1986)

Professional Experience:

Environmental Services of America, Senior Account Manager (1991-1996)

Responsibilities included sales and management of Midwest Accounts for a treatment, storage and disposal facility; field supervisor and sampling

HazChem Environmental, Account/Project Manager (1997-2005)

Responsibilities included development and maintenance of industrial accounts, field sampling, project management and emergency response

TestAmerica, Senior Account Executive (2005-2014)

Responsibilities included Midwest Laboratory Sales for a nationwide environmental laboratory network

With Eurofins Lancaster Laboratories since 2014

Principal Specialist Account Manager, Environmental Business Development/Sales (2014)

Responsibilities include Field Sales for Illinois, Wisconsin, and Indiana

Richard H. Karam, B.A., Director of Operations, Eurofins Lancaster Laboratories Environmental

Education:

B.A. Environmental Studies, Green Mountain College (2000)

Professional Experience:

Severn Trent Laboratories

Analytical Chemist (2000-2005)

Responsibilities included analyzing environmental samples for various general chemistry parameters, metals by ICP/ICPMS, pesticides/PCBs/herbicides by GC, and semivolatiles by GC/MS

Project Manager (2005-2006)

Responsibilities included managing environmental projects; writing case narratives; project set up

With Eurofins Lancaster Laboratories since 2006

Group Leader, GC/MS Semivolatiles (2006)

Responsibilities included coordinating production in GC/MS Semivolatiles; reviewing and signing reports

Manager, GC/MS Semivolatiles (2007)

Responsibilities included ensuring the accuracy and acceptability of all data generated by the GC/MS Semivolatiles group; coordinating daily prioritization of workload and monitoring the holding time and turnaround time status of samples; responding to client questions regarding GC/MS Semivolatiles data and methods and communicating technical issues or concerns about samples to project managers for clarification or resolution with the client

Manager, Organic Extraction/Leachate Preparation/GC/MS Volatiles/GC/MS Semivolatiles (2008)

Responsibilities included ensuring the accuracy and acceptability of all data generated by the groups; coordinating daily prioritization of workload and monitoring the holding time and turnaround time status of samples; responding to client questions regarding data and methods and communicating technical issues or concerns about samples to project managers for clarification or resolution with the client

Director of Operations, Eurofins Lancaster Laboratories Environmental (2014)

Responsibilities include leading departments in accordance with vision, values, and strategic goals of company; overseeing and facilitating efficient operations and systems, sound business practices, consistent client service, and motivated staff

Dana M. Kauffman, Manager, Sample Support and Data Deliverables

Continuing Education:

Introduction to Electronics, Lancaster County Career & Technology Center, Brownstown (1994)
AC/DC Electronics, Lancaster County Career & Technology Center (1995)
Entry Level Management (1997)
Gas Chromatography: Principles and Practices, Lancaster Labs University (2003)
Practical Process Improvement Facilitator Training (2009)
Practical Process Improvement Process Manager Training (2011)

Professional Experience:

With Lancaster Laboratories since 1994
- Lab Technician (1995)
- Senior Technician (1996)
- Sample Support Coordinator (1997)
- Group Leader, Sample Support (1999); Group Leader, Volatiles by GC (2002)
  - Responsibilities included supervising personnel; managing laboratory operations; project management; sample preparation; developing and evaluating new methods; reagent preparation; revising and updating SOPs; ordering supplies; training other analysts; running the automated storage and retrieval system; lab cleaning and maintenance; monitoring laboratory activities; performing internal audits; enforcing regulatory compliance requirements; maintaining required certifications; communicating client requirements to lab areas
- Manager, Sample Support and Data Deliverables (2005)
  - Responsibilities include overseeing all upfront sample handling requirements including storage, preservation, homogenization, moisture determination, volatile prescreen, and volatile soil prep; supervising group leader personnel; project management; revising and updating SOPs; performing internal audits; enforcing regulatory compliance requirements; maintaining required certifications; communicating client requirements to lab areas; data package and EDD TAT monitoring; overseeing all data package processes including data assembly, review, and processing; Practical Process Improvement (PPI) process manager responsible for facilitating PPI project team training and PPI efforts within LLI

Katherine A. Klinefelter, M.S., Principal Specialist, Environmental Client Services

Education:

B.S. Chemistry, Rutgers University (1983)
M.S. Physiology, Rutgers University (1985)

Continuing Education:

Additional graduate work in Physiology, Rutgers University (1985-1989)
Practical Process Improvement (Team Member Training), Lancaster Labs University (2009)

Professional Experience:

Rutgers University, Research and Teaching Assistant (1984-1989)
M. S. Hershey Medical Center of Penn State University, Senior Research Technician (1990-1993)
With Lancaster Laboratories since 1993
- Environmental Project Management
- Senior Specialist, Environmental Client Services (1993)
- Senior Specialist/Coordinator, Environmental Client Services (1996)
- Senior Specialist, Environmental Client Services (2000)
- Principal Specialist, Environmental Client Services (2007)
  - Responsibilities include project management; training new client service representatives; auditing sample entry; answering client questions; communicating client requirements to lab areas

Awards, Citations, Honorary Societies & Publications:

Dean's Graduate Student Dissertation Research Award, Rutgers University
Dean's Graduate Student Travel Award, Rutgers University
Steinetz Memorial Fund Award, Department of Biological Sciences, Rutgers University
10 abstracts and 3 scientific papers on membrane transport physiology
4 presentations on membrane transport physiology
Quarterly Impact Award for Practical Process Improvement (2009)

Wendy A. Kozma, B.S., Principal Specialist Group Leader, Environmental Client Services

Education:

B.S. Environmental Science, Allegheny College (1991)

Professional Experience:

Roy F. Weston, Inc. (1992-1993)

With Lancaster Laboratories since 1993

Senior Specialist, Environmental Client Services (1996)

Responsibilities included performing project management; advising clients on testing; providing price quotes; monitoring turnaround time; auditing sample entries; answering client questions; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions; ordering sampling containers

Principal Specialist, Environmental Client Services (2004)

Responsibilities included performing project management; advising clients on testing; providing price quotes; monitoring turnaround time; auditing sample entries; answering client questions; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions; ordering sampling containers

Principal Specialist Group Leader, Environmental Client Services (2006)

Responsibilities include performing project management; advising clients on testing; providing price quotes; monitoring turnaround time; auditing sample entries; answering client questions; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions; ordering sampling containers

M. Susan Kreider, Senior Specialist, Data Deliverables

Continuing Education:

Chemistry and Psychology courses, F&M College

Professional Experience:

General Cigar Co., R&D Center, Laboratory Technician (1963-1966)

Responsibilities included testing tobacco products; smoke analysis; nicotine and tar analysis; preparing samples for gas chromatography

Company F. Weaver, Inc., Laboratory Technician (1966-1967)

Responsibilities included performing microbiological testing of food products, both raw materials and finished products; training factory employees in sterile food handling

Microbiological Associates, Inc., Stock Line/Sterile Technician (1968-1969)

Responsibilities included performing cancer research; dissection of animal and human tissue for cell line production; freezing of live cells; all phases of sterile lab work

Warner Lambert Co., Assistant Microbiologist/Organic Chemistry Technician (1970-1975)

Responsibilities included performing microbiological and chemical testing of raw material and finished products

Julia Winifred & Co. (Jacks III), Sales Clerk (1982-1983)

Responsibilities included retail sales; preparing windows and displays in store

With Lancaster Laboratories since 1983

Laboratory Technician, ExpressLAB (1983)

Responsibilities included performing sample prep and analyses

Senior Technician, ExpressLAB (1986)

Responsibilities included performing sample prep and analyses

Chemist, ExpressLAB (1988)

Responsibilities included performing sample prep and analyses

Specialist, Pesticide Residue Analysis (1998)

Responsibilities included performing sample prep and analyses

Specialist, EPH/Misc. GC (2003)

Responsibilities included performing sample prep and analyses

Specialist, Data Deliverables (2005)

Responsibilities included validating and sending data deliverables

Senior Specialist, Data Deliverables (2006)

Responsibilities include validating and sending data deliverables

Robert M. Large, B.S., Director, Environmental Support Services: Client Services/Inside Business Development, Sample Administration, Data Deliverables, Sample Support, Transportation, Sample Kits, Various Service Centers

Education:
B.S. Zoology, Pennsylvania State University (1973)

Continuing Education:
Chromatography/Mass Spectral Interpretation, Finnigan MAT Institute (1981)
Foundations of Management, Gilbert Associates (1982)
M.B.A. Program, St. Joseph's University (1984-1987)
How to Market Professional Services, ACIL (1990)

Professional Experience:
Gilbert Associates, Inc., Program Manager (1977-1984)
Spotts, Stevens, & McCoy, Director of Client Services (1984-1990)
With Eurofins Lancaster Laboratories since 1990
Marketing Specialist, Environmental Client Services (1990)
Group Leader, Environmental Client Services (1994)
Manager, Environmental Client Services (1995)
Responsibilities included supervising personnel; project management; various office tasks; reviewed contract terms; interpreted QC implications to data quality; advised clients on testing; set up and managed the Bay Area Service Center in Richmond, CA (2001); managed Environmental Sample Administration (2002); managed Inside Business Development (2003)
Director, Environmental Support Services: Client Services, Inside Business Development, Sample Administration, Data Deliverables, Sample Support, Transportation, Sample Kits (2005)
Responsibilities included supervising personnel; project management; various office tasks; interpreting QC implications to data quality; advising clients on testing; assisting setting up Professional Scientific Staffing (PSS) for a major biotech client (2004); managing Data Deliverables and Sample Support (2010)
Director, Environmental Support Services: Client Services, Inside Business Development, Sample Administration, Data Deliverables, Sample Support, Transportation, Sample Kits, Various Service Centers (2012)
Responsibilities include supervising personnel; project management; various office tasks; reviewing contract terms; interpreting QC implications to data quality; advising clients on testing; setting up and managing service centers across the United States

Tara D. Laroche, M.S., National Program Manager, Business Development/Sales, Environmental Sciences

Education:
A.S. Science, Navarro College (1998)
M.S. Science - Biology, University of Texas at Arlington (2001)
B.S. Science, University of Louisiana at Monroe (2001)

Professional Experience:
Eichrom Technologies, Technical Sales Chemist (2008-2009)
Responsibilities included launching new product offering for a bio-assay for dioxin analysis to E/C firms and laboratories
AirToxics Laboratories, Technical Sales Representative (2009-2010)
Responsibilities included covering Great Lakes and East Coast calling on E/C firms
TestAmerica Laboratories, Account Executive (2011-2014)
Responsibilities included Covered Oklahoma, Colorado, Wyoming, and Utah calling on E/C firms and commercial/industrial clients.
With Eurofins Lancaster Laboratories since 2014
National Program Manager, Business Development/Sales, Environmental Sciences (2014)
Responsibilities include managing sales

Memberships and Appointments:
Colorado Oil & Gas Association
General Member (2011-present)
Rocky Mountain Association of Environmental Professionals
Vice President (2012-present)
Women's Energy Network
General Member (2014-present)
Marcellus Shale Coalition
Water Resources & Waste Management Committee member (2014-present)
Western Energy Alliance
Environmental & Regulatory Committee Member (2014-present)

Kerri E. Legerlotz, Senior Chemist, GC/MS Volatiles

Education:

B.S. Chemistry, Houghton College (2005)

Professional Experience:

Pfizer, Chemist (2005-2006)

Responsibilities included performing raw material, finished product, and stability testing; wet chemistry, pH, viscosity, IR, Karl Fischer, specific gravity

With Lancaster Laboratories since 2006

Chemist, GC/MS Volatiles (2006)

Responsibilities included testing for volatile compounds using GC/MS by purge and trap; preparing working standards from neat compounds

Senior Chemist, GC/MS Volatiles (2013)

Responsibilities include analyzing water and soil samples by purge and trap GC/MS; generating and reviewing raw data; performing maintenance on GC/MS, purge and traps, and various autosamplers; troubleshooting problems on GC/MS, purge and traps, and autosamplers; formulating and diluting analytical reference materials

Jenifer E. Lewis, B.S., Principal Specialist Account Manager, Environmental Business Development/Sales

Education:

B.S. Chemistry, University of Delaware (1984)

Continuing Education:

21 credits towards M.B.A., University of Delaware

Professional Experience:

J. M. Huber Corporation, Research Chemist (1984-1985)

With Eurofins Lancaster Laboratories since 1985

Chemist/Coordinator, Pesticide Residue Analysis (1989)

Group Leader, Pesticide Residue Analysis (1992)

Responsibilities included supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Manager, Pesticide Residue Analysis (1992)

Responsibilities included supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Manager, Pesticide Residue Analysis, EPH/Miscellaneous GC (1996)

Responsibilities included supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Manager, Pesticide Residue Analysis, EPH/Miscellaneous GC, Nitrosamines (1998)

Responsibilities included supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Manager, Pesticide Residue Analysis, EPH/Miscellaneous GC, Nitrosamines, Volatiles by GC (2005)

Responsibilities included supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Manager, Pesticide Residue Analysis, EPH/Miscellaneous GC, Nitrosamines (2011)

Responsibilities included supervising personnel; managing laboratory operations and financial resources; project management; reviewing and approving data; consulting with clients regarding testing needs

Principal Specialist Account Manager, Environmental Business Development/Sales (2012)

Responsibilities include developing new business revenue for LL by performing account management duties for existing accounts and prospects in the commercial and DOD markets; identifying and securing sales opportunities through phone calls, sales visits, presentations, team selling, quotes, and proposals; generating new business opportunities consistent with our operational capabilities and capacity

Larry Lewis, B.S., Manager, Volatiles in Air

Information not available at time of printing

Parker D. Lindstrom, B.S., Senior Chemist Metrology, Metals

Education:
- B.S. Chemical Oceanography, Millersville University (2002)

Continuing Education:
- Comprehensive Gas Chromatography Seminar, RESTEK (2002)
- Comprehensive GC/MS Seminar, RESTEK (2002)
- Statistics at Lancaster Laboratories, LLU (2005)
- 24-hour HAZWOPER, LLU (2006)

Professional Experience:
- Fred Fiorentino, Assistant Laborer (1997-2002)
  - Responsibilities included roofing, painting, general construction, clean-up, installation of windows, doors, stairs, decking
- Dr. Kerper, Office Assistant (2000-2002)
  - Responsibilities included filing, cataloging children's books
- Millersville University IMC/IMS, Media/Education Assistant (2000-2002)
  - Responsibilities included assisting teachers in creating media for the classroom, editing video and audio projects
- With Eurofins Lancaster Laboratories since 2002
  - Associate Chemist/Senior Chemist, GC/MS Volatiles (2002)
    - Responsibilities included running purge and trap and GC/MS to analyze samples and QC for VOCs; performing purge and trap and GC/MS maintenance
  - Senior Chemist, Metals (2006)
    - Responsibilities included running ICP/MS; verifying samples; performing maintenance; prepping samples; general troubleshooting for metals department; installation, maintenance and operation of CVAF low level Mercury; maintenance and operation of AA Mercury; providing general computer help to Computer Services department
  - Senior Chemist Metrology, Metals (2009)
    - Responsibilities include helping the instrument (Metrology) group maintain and qualify HPLCs, GCs, and other pharmaceutical instruments; helping with other qualifications as needed (hoods, storage units, etc); for a short time in 2009 verifying data in Water Quality department

Memberships and Appointments:
- Emergency Response Team (Spill Team), Lancaster Laboratories (2006)

Jason M. Long, B.S., Senior Chemist, GC/MS Volatiles

Education:
- B.S. Chemistry, Shippensburg University (2004)

Professional Experience:
- EA Engineering Science & Technology, Lab Tech (2004)
  - Responsibilities included setting up and running tests in toxicology lab; cleaning glassware used in performing tests; titrating for alkalinity and pH of water samples
- With Lancaster Laboratories since 2004
  - Chemist, GC/MS Volatiles (2004)
    - Responsibilities included analyzing water and soil samples by purge and trap GC/MS; generating and reviewing raw data; performing maintenance on GC/MS, purge and traps, and various autosamplers
  - Senior Chemist, GC/MS Volatiles (2007)
    - Responsibilities include analyzing water and soil samples by purge and trap GC/MS; generating and reviewing raw data; performing maintenance on GC/MS, purge and traps, and various autosamplers; troubleshooting problems on GC/MS, purge and traps, and autosamplers

Lyssa M. Longenecker, B.S., Senior Specialist, Environmental Client Services

Education:

B.S. Biology, Millersville University of PA (2010)

Professional Experience:

With Eurofins Lancaster Laboratories since 2011

Specialist, Environmental Client Services (2011)

Responsibilities included serving as the primary laboratory contact to clients; communicating technical information to the client in a comprehensible manner; deciphering the clients' testing needs; conveying the clients' requirements to the laboratory; ensuring clients' requirements and needs are met

Senior Specialist, Environmental Client Services (2014)

Responsibilities include serving as the primary laboratory contact to clients; communicating technical information to the client in a comprehensible manner; deciphering the clients' testing needs; conveying the clients' requirements to the laboratory; ensuring clients' requirements and needs are met

Karen P. Lopez, B.S., Project Manager, Bay Area Service Center

Education:

B.S. Environmental Science, University of California Riverside (2005)

Professional Experience:

Eurofins Air Toxics, Inc.

Account Manager (2008-2010)

Responsibilities included generating quotes for clients by gathering critical project information and coordinating with the sales and project management to determine product offering and price point; follow-up on quotes to gather sales and market intelligence; schedule client visits for sales and management; facilitate conference details and follow-up as needed; provide back-up for the Project Management team during staff absences or times of high workload

Project Manager (2010-2015)

Responsibilities included performing all project liaison functions needed for goal achievement between the clients, sales team, laboratory, and finance team; project management from A to Z, including contract execution, project set-up, project execution, and result achieved evaluation; respond professionally and timely to client inquiries, handle simple to complicated technical explanations

With Eurofins Lancaster Laboratories since 2015

Project Manager, Bay Area Service Center (2015)

Responsibilities include serving as the primary contact for a number of assigned clients; understanding technical information and communicating client requirements to laboratory personnel; help to ensure that requirements are met; managing large/complex projects according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales

Dorothy M. Love, B.S., Director, ELLE and Eurofins Environment Testing US, Quality Assurance

Education:

B.S. Environmental Health, Indiana University of Pennsylvania (1981)

Professional Experience:

Sun Transport, Inc., Safety Assistant (1980-1981)
Texas A & M University, Research Assistant (1982-1984)
Texas Water Commission, Chemist (1984-1986)
GHR Analytical, Chemist (1986-1987)
Clean Harbors, Inc., Senior Chemist (1987-1989)
With Eurofins Lancaster Laboratories since 1989

Senior Specialist (1989)
Senior QA Specialist (1998) Coordinator (2000)
Principal Specialist/Coordinator, Quality Assurance (2003)

Responsibilities included supervising personnel; training other QA staff; revised and updated analytical methods; monitored laboratory activities and corrective action for quality issues; performed internal audits; worked with external auditors; reviewed lab data and procedures; enforced regulatory compliance requirements; reviewed/wrote client/lab Quality Assurance Project Plans (QAPP)

Principal Specialist Group Leader, Quality Assurance (2005)

Responsibilities included supervising personnel; training other QA staff; revised and updated analytical methods; monitored laboratory activities and corrective action for quality issues; performed internal audits; worked with external auditors; reviewed lab data and procedures; enforced regulatory compliance requirements; reviewed/wrote client/lab Quality Assurance Project Plans (QAPP)

Manager, Environmental Quality Assurance (2013)

Responsibilities included supervising the Environmental QA department; monitoring regulatory activities; reviewing procedures and data; interacting with clients and agencies; performing regulatory and client document review; enforcing regulatory compliance; quality improvement; staff training; QA policy development and maintenance

Director, ELLE and Eurofins Environment Testing US, Quality Assurance (2015)
Responsibilities include supervising the ELLE QA department; monitoring regulatory activities; reviewing procedures and data; interacting with clients and agencies; performing regulatory and client document review; enforcing regulatory compliance; quality improvement; staff training; QA policy development and maintenance; overseeing QA programs at all Eurofins Environment BUs in order to harmonize quality and ethics systems across the environmental business

Memberships and Appointments:
Society of Women Environmental Professionals (SWEP (2007-present)
TNI Quality Systems Committee (2009-2014)
NJ Environmental Laboratory Advisory Committee (2012-present)

Natalie R. Luciano, B.A., Senior Specialist, Environmental Client Services

Education:
B.A. Biology, Bridgewater College (2006)

Continuing Education:
Safe Drinking Water Regulations Revisions, PaAAEL & PA DEP (2010)
PA Regulatory Update Bureau of Safe Drinking Water, PaAAEL (2013)
PA DEP Regulatory Update, PA DEP (2013)

Professional Experience:
With Eurofins Lancaster Laboratories Environmental, LLC since 2007
Specialist, Environmental Client Services and Inside Business Development (2007)
Responsibilities included performing project management; serving as the primary contact for external clients; communicating client requirements to laboratory areas; auditing entries and reviewing sample data
Senior Specialist, Environmental Client Services and Inside Business Development (2013)
Responsibilities include performing project management; serving as the primary contact for external clients; communicating client requirements to laboratory areas; auditing entries and reviewing sample data

Nicole L. Maljovec, M.S., Manager, Environmental Client Services & Inside Business Development

Education:
B.S. Chemistry, St. Bonaventure University (2004)
M.S. Adolescence Education, D'Youville College (2005)

Professional Experience:
CYTEC Industries, Industrial Hygiene Internship (2003-2004)
Responsibilities included performing air monitoring and sampling; complying with OSHA standards; assisting R/D lab with the identification of unknown chemicals and wastes
Niagara Wheatfield, Environmental Science Teacher (2005-2006)
Responsibilities included teaching chemistry, chemistry lab, and environmental science; developing special education plans to assist students with learning disabilities
With Lancaster Laboratories since 2006
Specialist, Environmental Client Services (2006)
Responsibilities included performing project management; advising clients on testing; providing price quotes; monitoring turnaround time; auditing sample entries; answering client questions; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions; ordering sampling containers
Senior Specialist Group Leader, Environmental Client Services (2007)
Responsibilities included performing project management; advising clients on testing; providing price quotes; monitoring turnaround time; auditing sample entries; answering client questions; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions; ordering sampling containers; managing a team of client service representatives and administrative assistants, training of new employees, setting up and delegating new projects, serving as primary project manager for several large clients and consultants
Principal Specialist Group Leader, Environmental Client Services (2012)
Responsibilities included serving as the primary contact or back-up with the laboratory for a number of assigned clients requiring specialized testing or complex projects; understanding and communicating technical information and client requirements to laboratory personnel, helping to ensure that requirements are met; leading broad-based complex projects to a satisfactory conclusion according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales; advising and training other members of the department; serving as a technical resource both internally and externally; proactively assisting Outside Business Development with client visits, presentations, and internal audits for assigned clients; participating on PPI teams
Manager, Environmental Client Services & Inside Business Development (2014)
Responsibilities include overseeing all managerial operations of the department; managing the department in an efficient and financially sound manner; providing leadership and coaching to assigned individuals; participating in long-and short-term planning and goal-setting for the group; coordinating functions and responsibilities of assigned department members to provide consistent service; coordinating internal efforts between Environmental Client Services and other departments; relaying corporate information appropriately

Melissa McDermott, B.A., Inside National Sales Manager, Business Development, Environmental Sciences

Education:

B.A. Biology, Millersville University (1992)
Elementary Education Certification, PA (May 2009)
Middle School Science Certification, PA (July 2009)

Continuing Education:

Gas Chromatography Principles and Practices (1995)
Conflict Resolution and Confrontation Skills Seminar (1996)
Coaching Skills for Supervisors Seminar (1996)
Waste Testing and Quality Assurance Symposium (1996)
Entry Level Management (1997)
How to Deliver Exceptional Customer Service Seminar (1997)
Statistics at Lancaster Laboratories (2006)

Professional Experience:

With Eurofins Lancaster Laboratories since 1992

Chemist, EPH/Misc. GC (1993)

Responsibilities included performing analysis of environmental samples for metals by AA flame and cold vapor generation; assembling client data packages

Chemist Coordinator, EPH/Misc. GC (1996)

Responsibilities included coordinating rush work; communicating with client service representatives regarding sample status; answering client questions; generating employee job plans; conducting employee evaluations

Senior Chemist, EPH/Misc. GC (1997)

Responsibilities included performing analysis of environmental samples for DRO and interpretive TPH analyses; verifying analyses performed by other analysts; preparing standards; revising departmental SOPs; method development; reviewing data packages

Senior Specialist, Environmental Client Services (1997)

Responsibilities included auditing sample entry; answering client questions; communicating client requirements to lab areas; providing status reports, including results, to clients; scheduling sample submissions and providing sampling containers

Senior Chemist, EPH/Misc. GC (2002)

Responsibilities included reviewing and approving data; writing departmental methods; reviewing and approving data packages; acting as technical resource within department; answering client questions; monitoring and performing QA metrics

Senior Specialist, Environmental Client Services (2007)

Responsibilities included acting as technical resource between client services and laboratories; scheduling sample submissions and providing sampling containers; communicating client requirements to lab areas

Senior Chemist, EPH/Misc. GC (2009)

Responsibilities included reviewing and approving data; writing departmental methods; reviewing and approving data packages; acting as technical resource within department; answering client questions; monitoring and performing QA metrics

Senior Chemist Group Leader, Pesticides (2011)

Responsibilities included performing routine and non-routine instrumental analyses of QC and clients' samples for pesticides, PCBs, herbicides, and other related compounds in accordance with departmental methods and standard operating procedures (SOPs); assisting in implementing special client requests; identifying and offering solutions to correct instrument problems and causes of QC problems; reviewing data for accuracy and completeness (for both routine and non-routine analyses, reports, or data packages); serving as a technical resource for the department; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow

Principal Specialist, Environmental Business Development (2014)

Responsibilities included using company literature, verbal discussions, formal written quotes, proposals, tours, and audits to independently secure new business consistent with operational capabilities and business plan goals; collaborating efforts and activities with those of Outside Sales account managers as needed; focusing on proposal writing for major national accounts; attending face-to-face sales meetings with selected national accounts as needed and maintaining responsibility for their maintenance and growth

Inside National Sales Manager, Business Development, Environmental Sciences (2015)

Responsibilities include overseeing all managerial operations of the department; managing the department in an efficient and financially sound manner; providing leadership and coaching to assigned individuals; participating in long-and short-term planning and goal-setting for the group; coordinating functions and responsibilities of assigned department members to provide consistent service; relaying corporate information appropriately

Roy R. Mellott Jr., B.S., Senior Chemist Group Leader, GC/MS Volatiles

Education:

B.S. Biology, Millersville University (1993)

Continuing Education:

Hazardous Waste Disposal, LLU (1996)
GC: Principles & Practices, LLU (1997)
GC/MS: Applications/Troubleshooting Seminar, ECS/MDL Systems, Inc. (1999)
Introduction to Interpretation of Mass Spectra, LLU (2005)
Interpretation of Mass Spectra, Intermediate, LLU (2005)
Role of the Leader 1 – Giving Recognition, LLU (2007)
Role of the Leader 2 – Clarifying Performance Expectations, LLU (2007)
Role of the Leader 3 – Developing Others, LLU (2007)
Role of the Leader 4 – Providing Constructive Feedback, LLU (2007)
PPI Team Training, LLU (2010)
PPI Facilitator Workshop, LLU (2010)
Targeted Selection, LLU (2010)
Role of the Leader Building Team Pride and Purpose, LLU (2011)
Role of the Leader Resolving Conflicts with Your Peers, LLU (2011)

Professional Experience:

With Eurofins Lancaster Laboratories since 1995

Senior Lab Tech I, GC/MS Volatiles (1995)

Responsibilities included requisitioning samples; performing sample storage, prescreening, discard, hazardous waste disposal; tracking down missing samples by various means

Chemist/Auditor, GC/MS Volatiles (1996)

Responsibilities included performing analysis of waters, soils, and other matrices for VOCs via various analytical methods; evaluation of analytical data; calibrating and troubleshooting various GC/MS equipment; evaluation/review of analyst-generated data; corresponding with analysts about possible trends (whether analyst- or system-related) in generated data; evaluation/review of corrections of problems with generated data

Senior Chemist, GC/MS Volatiles (2002)

Responsibilities included performing analysis of waters, soils, and other matrices for VOCs via various analytical methods; evaluation of analytical data; setting up, calibrating, and troubleshooting various GC/MS equipment; evaluation/review of analyst-generated data; corresponding with analysts about possible trends (whether analyst- or system-related) in generated data; evaluation/review of corrections of problems with generated data; updating/correcting SOPs and laboratory and analytical procedures; preparation, tracking and documentation of analytical standards used in the laboratory; training of new employees to the department

Senior Chemist Group Leader, GC/MS Volatiles (2005)

Responsibilities include performing analysis of waters, soils, and other matrices for VOCs via various analytical methods; evaluation of analytical data; setting up, calibrating, and troubleshooting various GC/MS equipment; evaluation/review of analyst-generated data; corresponding with analysts about possible trends (whether analyst- or system-related) in generated data; evaluation/review of corrections of problems with generated data; updating/correcting SOPs and laboratory and analytical procedures; preparation, tracking and documentation of analytical standards used in the laboratory; training of new employees to the department

Memberships & Appointments:

Nature Conservancy (1998-present)
Eurofins Lancaster Laboratories
- Ethics Committee (1999-2003)

Lancaster Herpetological Society
- Treasurer (2005-present)

HabitatMT (2011-present)

Jessica L. Miller, B.S., Senior Chemist, Pesticide Residue Analysis

Education:

B.S. Chemistry, Cedar Crest College (2011)

Continuing Education:

Gas Chromatography Principles and Practice (2011)
Agilent Breaking Bad Chromatography Habits Seminar (2014)

Professional Experience:

With Eurofins Lancaster Laboratories since 2011
- Chemist, Pesticide Residue Analysis (2011)
  - Responsibilities included performing pesticide residue analysis; prescreening samples; calibrating, reviewing, and uploading data
- Senior Chemist, Pesticide Residue Analysis (2014)
  - Responsibilities include performing pesticide residue analysis; prescreening samples; calibrating, reviewing, and uploading data

Memberships and Appointments:

Psi Chi
- Member (2009)

Gamma Sigma Epsilon
- Member (2011)

Megan A. Moeller, B.S., Senior Specialist, Environmental Client Services

Education:

B.S. Environmental Science, University of Delaware (1999)

Professional Experience:

With Lancaster Laboratories since 1999
- Sample Administration/Client Service Specialist, Environmental Client Services (2003)
  - Responsibilities included Interpretation and entry of incoming samples. Route samples to the correct locations. Assist Client Service representatives with auditing, reviewing reports, and reviewing invoices.
- Specialist, Environmental Client Services (2004-2006)
  - Responsibilities included managing projects, prepare quotations, audit sample entries, answer client questions, communicate client requirements to lab areas, schedule sample submissions, and provide sample containers.
- Senior Specialist, Environmental Client Services (2006)
  - Responsibilities include managing projects, prepare quotations, audit sample entries, answer client questions, communicate client requirements to lab areas, schedule sample submissions, and provide sample containers.

Chad A. Moline, B.S., Senior Specialist, GC/MS Volatiles

Education:

B.S. Environmental Studies, Slippery Rock University (1998)
Teaching Certification, Secondary Education, Millersville University (2003)

Professional Experience:

Centre Analytical Laboratories, Lab Technician (1999-2000)
- Responsibilities included running various wet chemistry analyses

Lancaster Laboratories, Chemist/Senior Chemist (2000-2005)
- Responsibilities included maintaining GC/MS instrumentation

Warwick School District, Science Teacher (2005-2006)
- Responsibilities included teaching chemistry and physics to 8th grade students

Conestoga Valley School District, Science Teacher (2006-2007)
- Responsibilities included teaching chemistry and earth science to 8th grade students

With Eurofins Lancaster Laboratories since 2007
- Senior Chemist Group Leader, GC/MS Semivolatiles (2007)
  - Responsibilities included monitoring workflow; meeting client turnaround times
- Senior Chemist, GC/MS Semivolatiles (2012)
  - Responsibilities included maintaining and operating GC/MS instrumentation
- Senior Specialist, GC/MS Volatiles (2014)
  - Responsibilities include performing technical audit of GC/MS volatiles data in a timely manner with zero defects as a goal; acting as a technical resource to department; evaluating issues in technical data and suggesting possible solutions; performing sample/QC verification in the LIMS; reviewing analytical reports; evaluating and interpreting analytical results; writing and revising SOPs; assisting in responding to and eliminating ICARs; making recommendations for technical improvements; communicating effectively within department; completing assigned tasks on time; assisting in "brainstorming" client problems and projects; performing all duties with minimal supervision

Jennifer L. Moyer, B.S., Senior Specialist, Metals

Education:

B.S. Chemistry, Lock Haven University (2000)

Professional Experience:

Lock Haven University, Lab Tech (1996-1998)
Responsibilities included setting up labs; stocking and setting up stock rooms; helping professors with projects
Croda Inc., Process Development Chemist (1998-2000)
Responsibilities included developing and improving procedures on existing products
With Lancaster Laboratories since 2000
Chemist, Metals (2000)
Responsibilities included running and maintaining ICP instruments
Chemist, Metals (2002)
Responsibilities included running and maintaining Graphite Furnace Atomic Absorption instruments
Group Leader/Specialist, Metals (2003)
Responsibilities included overseeing Graphite Furnace Atomic Absorption and Mercury analysts
Senior Specialist, Metals (2007)
Responsibilities include verifying ICP, GFAA, Mercury, and ICP-MS

Kevin T. Moran, M.B.A., Senior Specialist Account Manager, Environmental Business Development/Sales

Education:

B.S. Marine Engineering, U.S. Merchant Marine Academy (1972)
M.B.A. Marketing, Babson College (1981)

Professional Experience:

SAIC, Regional Sales Manager (1994-1999)
Responsibilities included selling process treatment equipment for groundwater remediation to environmental consulting companies and industrial end users; managing a staff of seven engineers and technicians engaged in operating and constructing groundwater treatment systems
Mantech Environmental, Marketing Manager (1999-2000)
Responsibilities included developing strategy to target industrial customers with multiple sites for an innovative groundwater remediation technology
Hazleton Environmental, Marketing Manager (2000-2003)
Responsibilities included developing marketing strategy for sales of process treatment equipment to industrial and municipal users; aiding company in breaking into DOD market for treatment equipment
With Eurofins Lancaster Laboratories since 2003
Senior Specialist Account Manager, Environmental Business Development/Sales (2003)
Responsibilities include managing and growing revenue at assigned industrial accounts; using selling skills to add new industrial and environmental consulting firms for analytical services in New York, New Jersey, and New England

Kathrine K. Muramatsu, B.S., Senior Chemist Group Leader, GC/MS Volatiles

Education:

B.S. Chemistry, University of Colorado (2005)

Continuing Education:

Forensic Science and DNA Testing Certification (2006)
24-Hour Emergency Response (HAZWOPER), Lancaster Laboratories (2009)
American Heart Association (AHA)/American Red Cross certified, Lancaster Laboratories (2009)

Professional Experience:

With Eurofins Lancaster Laboratories since 2007
Chemist, Analytical Chemistry, Professional Scientific Staffing – CO (2007)
Responsibilities included ensuring compliance with cGMPs; performing analysis of system water, clean in place (CIP) samples, clean out of place (COP) samples, and other sample types; methods used were total organic carbon (TOC), pH, conductivity, Limulus Amebocyte Lysate (LAL), and UV spectroscopy
Chemist, GC/MS Volatiles (2007)
Responsibilities included analyzing environmental samples of various sample matrices using purge and trap GC/MS; generating and reviewing raw data; performing instrument maintenance as needed
Chemist Group Leader, GC/MS Volatiles (2009)
Responsibilities included supervising and mentoring personnel; coordinating daily workload through prioritizing and scheduling; processing monthly metrics for the department; verifying sample data; analyzing environmental samples of various sample matrices using purge and trap GC/MS; generating and reviewing raw data; performing instrument maintenance as needed

Senior Chemist Group Leader, GC/MS Volatiles (2014)

Responsibilities include supervising and mentoring personnel; coordinating daily workload through prioritizing and scheduling; processing monthly metrics for the department; verifying sample data; analyzing environmental samples of various sample matrices using purge and trap GC/MS; generating and reviewing raw data; performing instrument maintenance as needed

Awards, Citations, Honorary Societies, and Publications

Dean's List (2002)
Colorado Scholars (2002-2005)
Superlative Service Award (2010)
Two publications in the Journal of Organic Chemistry

Memberships and Appointments:

American Chemical Society

Charles J. Neslund, B.S., Technical Director, Volatiles in Air and Specialty Services Group, Eurofins Lancaster Laboratories Environmental

Education:

B.S. Chemistry, University of Pittsburgh (1982)

Continuing Education:

Graduate studies in organic chemistry, University of Pittsburgh (1983)

Professional Experience:

Lancaster Laboratories (1984-1996)

Chemist (1986)
Group Leader (1987)
Chemist (1991)

OI Analytical, Sales Representative (1996)

With Eurofins Lancaster Laboratories since 1997

Group Leader, GC/MS Semivolatiles (1997)

Responsibilities included supervising personnel; scheduling lab work; managing laboratory operations and financial resources; project management; data interpretation; reviewing and approving data; developing and evaluating new methods; consulting with clients regarding testing needs; revising and updating SOPs and analytical methods

Manager, GC/MS Semivolatiles and Volatiles in Air (2005)

Responsibilities included supervising personnel; scheduling lab work; managing laboratory operations and financial resources; project management; data interpretation; reviewing and approving data; developing and evaluating new methods; consulting with clients regarding testing needs; revising and updating SOPs and analytical methods

Manager, Volatiles in Air and Specialty Services Group (2007)

Responsibilities included supervising personnel; scheduling lab work; managing laboratory operations and financial resources; project management; data interpretation; reviewing and approving data; developing and evaluating new methods; consulting with clients regarding testing needs; revising and updating SOPs and analytical methods; marketing specialty services capabilities; conducting technical presentations

Technical Director, Volatiles in Air and Specialty Services Group, Eurofins Lancaster Laboratories Environmental (2014)

Responsibilities include leading departments in accordance with vision, values, and strategic goals of company; overseeing and facilitating efficient operations and systems, sound business practices, consistent client service, and motivated staff

Awards, Citations, Honorary Societies & Publications:

Dawson-Grundmann Innovation Award (1995)

Memberships & Appointments:

American Chemical Society (ACS)
Chromatography Forum of the Delaware Valley (CFDV)
Past member of Executive Committee of the Chromatography Forum of the Delaware Valley
Air & Waste Management Association (A&WMA)
Society of Environmental Toxicology and Chemistry (SETAC)
Sediment Management Workgroup (SMWG)

Deborah A. Neslund, Senior Specialist, Environmental Sample Administration

Professional Experience:

Lancaster General Hospital, Phlebotomist (1976-1977)
Fairfax Hospital, LPN (1978)
Lancaster General Hospital, Phlebotomist/EKG Technician (1980-1986)
With Eurofins Lancaster Laboratories since 1986

Senior Specialist Coordinator, Environmental Sample Administration (1986)

Responsibilities included supervising personnel; directed flow of samples to include prioritization to meet hold times and standards set for rush and other samples; developed and improved systems for efficiency within SA; represented SA in communications with Technical Groups, Client Services, and other support areas; logged-in samples

Senior Specialist Group Leader, Environmental Sample Administration (2005)

Responsibilities included supervising personnel; directed flow of samples to include prioritization to meet hold times and standards set for rush and other samples; developed and improved systems for efficiency within SA; represented SA in communications with Technical Groups, Client Services, and other support areas; logged-in samples

Senior Specialist (2013)

Responsibilities include directing flow of samples to include prioritization to meet hold times and standards set for rush and other samples; developing and improving systems for efficiency within SA; representing SA in communications with Technical Groups, Client Services, and other support areas; logging-in samples

Ryan V. Nolt, B.S., Manager, GC/MS Volatiles and Equipment Maintenance & Repair

Education:

B.S. Chemistry, Millersville University (1997)

Professional Experience:

With Eurofins Lancaster Laboratories since 1996

Clerk II, Sample Support (1996)

Responsibilities included performing ASRS operations, preserving incoming samples, homogenizing samples, packing bottle orders, and performing sample discard

Senior Technician, ExpressLAB (1997)

Responsibilities included performing sample dilutions, preparing standards, prepping samples, and setting up new instruments

Chemist, GC/MS Volatiles (1998)

Responsibilities included performing purge and trap and GC/MS maintenance; tuning and calibrating GC/MS system; analyzing samples; reviewing, working up, and assembling all supporting data; and preparing new standards

Senior Chemist Coordinator, GC/MS Volatiles (2000)

Responsibilities included performing routine and non-routine laboratory analysis; diagnosing and solving technical problems; implementing improvements to maximize quality; maintaining and troubleshooting instruments; writing and revising SOPs; validating new methods and equipment; assigning new work to instrument groups and monitoring productivity; training new analysts

Principal Chemist Group Leader, GC/MS Volatiles (2005)

Responsibilities included performing routine and non-routine laboratory analysis; diagnosing and solving technical problems; implementing improvements to maximize quality; maintaining and troubleshooting instruments; writing and revising SOPs; validating new methods and equipment; assigning new work to instrument groups and monitoring productivity; training new analysts

Manager, GC/MS Volatiles (2014)

Responsibilities included performing a variety of technical and administrative tasks to develop, evaluate, and supervise staff; planning and monitoring work flow; designing, implementing, and utilizing departmental operations systems; promoting safety; remaining current on technical developments in the area of GC/MS volatiles; communicating with clients; maintaining a strong commitment to quality

Manager, GC/MS Volatiles and Equipment Maintenance & Repair (2015)

Responsibilities include performing a variety of technical and administrative tasks to develop, evaluate, and supervise staff; planning and monitoring work flow; designing, implementing, and utilizing departmental operations systems; promoting safety; remaining current on technical developments in the area of GC/MS volatiles; communicating with clients; maintaining a strong commitment to quality

Stephen Nowakowski, B.S., Senior Specialist, Safety

Information not available at time of printing

Wanda Oswald, Senior Scientist Group Leader, Organic Extraction
Information not available at time of printing

Anneliese H. Owen, M.B.A., Manager, Environmental Sample Administration
Education:
- B.S. Molecular and Cell Biology, Pennsylvania State University (1986)
- M.B.A. Pennsylvania State University (1993)

Professional Experience:
- With Lancaster Laboratories since 1986
  - Coordinator (1987)
  - Client Services Specialist (1988)
  - Business Development Specialist (1990)
  - Group Leader, Environmental Sample Administration (1992)
    - Responsibilities included: supervise personnel; manage laboratory operations and financial resources; sample interpretation and entry; and monitor corrective action for quality issues.
  - Manager, Environmental Sample Administration (2005)
    - Responsibilities include: supervise personnel; manage laboratory operations and financial resources; sample interpretation and entry; and monitor corrective action for quality issues.

Linda C. Pape, B.A., Senior Chemist, GC/MS Volatiles
Education:
- B.A. Business Administration, Milsaps College (1985)

Professional Experience:
- Rite Aid Pharmacy, Store Manager (1985-1989)
  - Responsibilities included being responsible for overall maintenance and security of merchandise, store, and property; ordering and display of all merchandise; auditing daily cash and inventory reports; scheduling employees; payroll accounting; training of new and prospective personnel
- With Lancaster Laboratories since 1993
  - Chemist, Volatiles by GC (1993)
    - Responsibilities included analyzing client-submitted samples and their associated quality control samples by purge-and-trap gas chromatography; reviewing and uploading the corresponding data in an efficient manner with a high degree of accuracy and quality; evaluating current organizational and analytical systems; suggesting and implementing necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; initiating and leading technical projects to a timely, accurate, and efficient conclusion while meeting client and/or regulatory requirements with a high degree of quality
  - Chemist, Water Quality (2000)
    - In addition to responsibilities listed above performed CN distillation, PO_4 digestion, and phenol distillation during a 3-month time frame
  - Senior Chemist, Volatiles by GC (2007)
    - Responsibilities included analyzing client-submitted samples and their associated quality control samples by purge-and-trap gas chromatography; reviewing and uploading the corresponding data in an efficient manner with a high degree of accuracy and quality; performing final review (verification) of data for clients (adding appropriate comments as necessary); evaluating current organizational and analytical systems; suggesting and implementing necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; initiating and leading technical projects to a timely, accurate, and efficient conclusion while meeting client and/or regulatory requirements with a high degree of quality; training new employees in Volatiles by GC soils
  - Senior Chemist, Volatiles by GC/MS (2008)
    - Responsibilities included analyzing client-submitted samples and their associated quality control samples by purge-and-trap gas chromatography/mass spectrometry; reviewing and uploading the corresponding data in an efficient manner with a high degree of accuracy and quality; performing final review (verification) of data for clients (adding appropriate comments as necessary); evaluating current organizational and analytical systems; suggesting and implementing necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; initiating and leading technical projects to a timely, accurate, and efficient conclusion while meeting client and/or regulatory requirements with a high degree of quality; training new employees
  - Senior Chemist, GC/MS Volatiles (2009)
    - Responsibilities include analyzing client-submitted samples and their associated quality control samples; reviewing and uploading the corresponding data in an efficient manner with a high degree of accuracy and quality; performing final review (verification) of data for clients (adding appropriate comments as necessary); evaluating current organizational and analytical systems; suggesting and implementing necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; initiating and leading technical projects to a timely, accurate, and efficient conclusion while meeting client and/or regulatory requirements with a high degree of quality; training new employees

James H. Place, B.S., Senior Chemist, Pesticide Residue Analysis

Education:

B.S. Physical Science, York College of Pennsylvania (1997)

Professional Experience:

AMZ Corporation, Laboratory Technician (1998-2000)

Responsibilities included performing analysis and maintenance of chemical compositions pertaining to electroplating baths

Nichia America Co., Laboratory Technician (2000-2001)

Responsibilities included performing analysis of phosphorus for composition of pigments; performing sample screening and AA analysis

AMZ Corporation, Laboratory Technician (2001-2003)

Responsibilities included performing analysis and maintenance of chemical compositions pertaining to electroplating baths; conducting inventory and ordering chemicals

With Lancaster Laboratories since 2003

Chemist, Pesticide Residue Analysis (2003)

Responsibilities include performing routine and non-routine instrumental analyses of QC and clients' samples for pesticides, PCBs, herbicides, and other related compounds in accordance with departmental methods and SOPs; achieving quality results within the time-frame expected by our clients with minimal daily supervision; maintaining the GCs or HPLCs used for routine analyses; identifying and correcting common instrument or QC problems

Senior Chemist, Pesticide Residue Analysis (2008)

Responsibilities include performing routine and non-routine instrumental analyses of QC and clients' samples for pesticides, PCBs, herbicides, and other related compounds in accordance with departmental methods and SOPs; assisting in implementing special client requests; identifying and offering solutions to correct instrument problems and causes of QC problems; reviewing data for accuracy and completeness (for both routine and non-routine analyses, reports, or data packages); serving as a technical resource for the department

Kaitlin N. Plasterer, B.S., Senior Specialist, Environmental Client Services

Education:

B.S. Chemistry/Business, Arcadia University (2010)

Professional Experience:

With Eurofins Lancaster Laboratories since 2011

Specialist, Environmental Client Services (2011)

Responsibilities included serving as the primary contact for assigned clients; understanding basic technical issues and working with management to achieve problem resolution with clients; auditing incoming client paperwork for accuracy and making necessary corrections; assisting Senior Specialists with auditing as needed; identifying problems and suggesting solutions; maintaining knowledge of regulatory requirements and changes that may affect clients

Senior Specialist, Environmental Client Services (2014)

Responsibilities include acting as the environmental client liaison within the laboratory by communicating client's requirements to the technical staff by maintaining project-related documentation, communicating desired turnaround times, and managing information flow; facilitating and organizing client audits, visits, and conference calls; monitoring ongoing projects and providing status updates as needed; auditing client sample paperwork and resolving discrepancies; overseeing the general administration of environmental projects (issuing quotations, answering billing and reporting questions, and scheduling sample pickups); managing a combination of routine, non-routine, and complex client projects; initiating improvements to drive efficiencies; assisting in training; updating training documents and SOPs as appropriate

Awards, Citations, Honorary Societies, and Publications:

Phi Beta Delta Honors Society for Excellence in international education (2010)

Christine M. Ratcliff, B.S., Principal Specialist Group Leader, Specialty Services Group

Education:
B.S. Chemistry, Shippensburg University (1988)

Continuing Education:
Mass Spectral Interpretation, Finnigan MAT Institute (1990)

Professional Experience:
With Eurofins Lancaster Laboratories since 1988
Chemist (1991)
Coordinator (1994)
Group Leader (1996)
Senior Chemist/Coordinator (1997)
Senior Chemist (2002)
Responsibilities included reviewing and approving data; revising and updating SOPs and analytical methods; reviewing lab data
Senior Specialist, GC/MS Semivolatiles (2005)
Responsibilities included reviewing and approving data; revising and updating SOPs and analytical methods; reviewing lab data
Principal Specialist, GC/MS Semivolatiles (2009)
Responsibilities included reviewing and approving data; revising and updating SOPs and analytical methods; reviewing lab data; performing technical audit of GC/MS semivolatiles data in a timely manner
Principal Specialist, Volatiles in Air (2009)
Responsibilities included reviewing and approving data; revising and updating SOPs and analytical methods; reviewing lab data; performing technical audit of Volatiles in Air, GC/MS semivolatiles, and GC/MS volatiles data in a timely manner
Principal Specialist, Volatiles in Air (2009)
Responsibilities included reviewing and approving data; revising and updating SOPs and analytical methods; reviewing lab data; performing technical audit of Volatiles in Air, GC/MS semivolatiles, GC/MS volatiles, and dioxans and furans data in a timely manner
Principal Specialist Group Leader, Specialty Services Group (2014)
Responsibilities include reviewing and approving data; revising and updating SOPs and analytical methods; reviewing lab data; performing technical audit of Volatiles in Air, GC/MS semivolatiles, GC/MS volatiles, and dioxans and furans data in a timely manner; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow; monitoring data for and supporting departmental MOS

Mark A. Ratcliff, B.A., Senior Specialist, GC/MS Semivolatiles

Education:
B.A. Physics, Franklin & Marshall College (1988)

Continuing Education:
Finnegan Mass Spectral Interpretation Course (1991)

Professional Experience:
With Eurofins Lancaster Laboratories since 1989
Chemist (1992)
Senior Chemist (1996)
Responsibilities included performing GC/MS semivolatiles testing; operating GC/MS instruments; data interpretation; calibrating and repairing instruments; preparing standards; revising and updating SOPs; training other analysts
Senior Specialist, GC/MS Semivolatiles (2005)
Responsibilities include performing GC/MS semivolatiles testing; operating GC/MS instruments; data interpretation; calibrating and repairing instruments; preparing standards; revising and updating SOPs; training other analysts

Barbara F. Reedy, B.S., Senior Specialist, Environmental Quality Assurance

Education:

B.S. Environmental Biology, Millersville University (1993)

Continuing Education:

Environmental GC Analysis Seminar, Restek (2001)
The Internet Audit A Quality Tool, PaAAEL (2001)
Advanced Gas Chromatography Mass Spectroscopy Seminar, PaAAEL (2002)
LC/MS/MS System Seminar, Applied Biosystems (2006)
Introduction to Root Cause Analysis, Patton Professional (2007)
When to Initiate Corrective Action, Patton Professional (2007)
Practical Process Improvement Training in the role of Team Member (2008)
GC Pesticide/PCB's Analysis Training Seminar (2008)
NY/PAAAEL Annual Meeting - Internal & Electronic Audits: Satisfying Regulatory Requirements, Corrective and Preventive Actions, Ethics and Data Integrity Training (2009)
Environmental Laboratory Assessment Basic Assessor Training – TNI Standard 2009 (2012)

Professional Experience:

Department of Environmental Resources, Division of Rivers and Wetlands, Scientific Intern (1993)
Responsibilities included reviewing wetland permits applications; inspecting and photographing wetland mitigation sites; determining hydrology, soil type, and the consistency of the mitigation with the approved project plans; researching records of the sites

With Eurofins Lancaster Laboratories since 1993

Associate Chemist/Chemist, Volatiles by GC (1993)
Responsibilities included calibrating Capillary, VOA, BTEX, and FID instruments; performing routine maintenance; interpreting, reviewing, and uploading data

Senior Chemist, Volatiles by GC (1999)
Responsibilities included being primary verifier for the majority of data for Volatiles by GC for the ELCD/PID and FID for both waters and soils; signing of analytical reports; generating statistically determined QC windows; training new analysts to review and upload data into the LIMS

Senior Specialist, Environmental Quality Assurance (2001)
Responsibilities include ensuring quality of data being produced in the laboratories by performing data review, auditing laboratories, and reviewing written procedures; ensuring laboratory adherence to government regulations and client requirements; reviewing client and government documents for requirements outside our usual laboratory practices; setup and testing new analysis in the laboratory sample management system as required by the departments; maintaining documentation of agency certifications

Memberships & Appointments:

Pennsylvania Association of Accredited Laboratories (2013-present)

Beth A. Rich, Senior Specialist, Safety

Professional Experience:

With Eurofins Lancaster Laboratories since 1998

Senior Administrator, Human Resources (1998)
Responsibilities included entering and maintaining employee information in system; photocopying, filing, maintaining personnel files; tracking mid-year and annual job plan completion; following up on exit interviews and other HR admin and support

Specialist, Human Resources (2005)
Responsibilities included maintaining a high level of human resource generalist knowledge to support all personnel in the HR department and to serve all employees

Senior Specialist, Human Resources (2010)
Responsibilities included maintaining a high level of human resource generalist knowledge to support all personnel in the HR department and to serve all employees

Senior Specialist, Safety (2013)
Responsibilities include managing worker's compensation and return to work programs; coordinating annual health screenings, flu shots, and blood bank donations; setting up new site worker's compensation systems as needed; filing incident reports and tracking recordable incidents; coordinating special medical programs as needed

John R. Riggs, Jr., B.S., Senior Specialist Group Leader, Environmental Software Development

Education:

B.S. Professional Studies (Computer Science/Mathematic), Misericordia University (1994)

Continuing Education:

Masters Business Administration, Elizabethtown College (Expected graduation date: 2015)

Professional Experience:

Nissin Foods, Inc., Distribution Supervisor/IT Engineer (1994-1998)

Responsibilities included acting as a liaison between local and corporate management teams; supervised the activities of multiple teams of material handlers engaged in receiving, storing, and shipping finished goods; ensured the accuracy of orders and inventory to meet customer demand; maintained documentation and prepared reports which reflected the effectiveness and efficiency of department activities; Implemented warehouse safety procedures and hold regular safety meetings; established and recommended changes to policies to improve the organization; supported and maintained Novell servers and backups; administered user accounts and email; configured new desktop machines and maintained existing work stations

AVAR, Project Manager/Lead Developer (1998-2014)

Responsibilities included directing the planning, design, production and management of applications and data centers; lead a development team in creating software applications to provide business solutions; acted as a point of contact for vendors, business units, and Information Technology partners during integration of projects, administering schedules and communicating risks; conducted meetings, helping to facilitate communication and maximize productivity; coordinated the work of multiple teams to support applications for data management systems; oversaw creation and maintenance of all unit and system testing plans; supervised the generation of documentation and technical guides for end users; prepared and deliver end-user training

With Eurofins Lancaster Laboratories since 2014

Senior Specialist Group Leader, Environmental Software Development (2014)

Responsibilities include providing technical support for maintenance of installed software applications and assisting with the development, installation, and maintenance of new applications for general use; assisting in development, implementation, and maintenance of software intended to improve the quality and efficiency of work performed

Heidi L. Roberts, B.S., Senior Chemist, Organic Extraction

Education:

B.S. Environmental Science/Biology, Kutztown University (1996)

Continuing Education:

P.E. Spectroscopy Seminar, Perkin Elmer (1998)
Statistics, LLU (1999)
Pharm. Calc. Class, LLU (1999)
LLI Leadership Training (2000)
Practical Process Improvement Team Member Training (2008)
Practical Process Improvement Facilitator Training (2010)

Professional Experience:

M.J. Reider Associates, Lab Technician (1996-1997)

Responsibilities included organics prep/method development for HEM/various wet chemistry analyses

With Eurofins Lancaster Laboratories since 1997

Chemist, Metals (1998)

Responsibilities included performing metals analyses, maintenance of instruments, verification of analyses, analyzed GMP samples, administered quad studies, MDL studies, IDL studies

Coordinator, Metals (1999)

Responsibilities included coordination of GFAA/FAA/Hg group, verification of analyses, instrument maintenance and operation, updating of SOPs, training records, quad studies, MDLs, and IDLs, performed GMP analyses

Coordinator/Specialist, Environmental Client Services (2001)

Responsibilities included supervising Commercial Account Team and administrators, handle miscellaneous and homeowner calls, prepare bottle orders, audit sample paperwork, monitor sample progress, and handle client concerns

Senior Specialist Group Leader, Environmental Client Services (2005)

Responsibilities included supervising Account Management Team and administrator, work with team members on continual process improvement, manage several large client accounts, prepare bottle orders, audit sample paperwork, monitor sample progress, and handle client concerns

Senior Chemist, Organic Extraction (2007)

Responsibilities include performing non-routine extractions, scheduling prep work, verification of prepped batches, processing MOS reports, updating EtQ for DP36, point person for project rollouts

Memberships and Appointments:

Ethics Committee, Lancaster Laboratories (1998)
MOS Process Improvement Team, Lancaster Laboratories (2005)

Nicholas R. Rossi, M.S., Senior Chemist, EPH/Misc. GC

Education:

B.S. Biology, Messiah College (2005)
M.S. Environmental Pollution Control, Penn State Harrisburg (2011)

Professional Experience:

Vermont Agency of Agriculture, Laboratory Technician/Sample Collector (2004-2005)
Responsibilities included collecting water samples from agricultural sites and extracting samples in the lab
With Eurofins Lancaster Laboratories since 2005
Chemist, GC/MS Volatiles (2005)
Responsibilities included organizing batches of samples, sample preparation, analyzing soil and water samples for volatile organic compounds using purge and trap GC-MS, instrument maintenance, and performing a level II audit on data prior to verification; processing plan improvement (PPI) team to reduce the amount of errors in the prescreen department; evaluating the process, implementing changes, and tracking results
Chemist, EPH/Misc. GC (2011)
Responsibilities included analyzing routine and non-routine samples and their associated quality control samples by gas chromatography; reviewing and reporting the corresponding data; maintaining, optimizing, and calibrating equipment (functions are to be performed in an efficient manner with a high degree of accuracy and quality); assisting in organization of related departmental work and in sample preparation (as required) to consistently meet client turnaround time requirements
Senior Chemist, EPH/Misc. GC (2013)
Responsibilities include performing routine and non-routine instrumental analyses of QC and clients' samples for total petroleum hydrocarbons, diesel range organics, and other miscellaneous organic compounds in accordance with departmental methods and SOPs; assisting in implementing special client requests; identifying and offering solutions to correct instrument problems and causes for QC problems; reviewing data for accuracy and completeness for routine and non-routine analyses, reports, or data packages; serving as a technical resource for the department

Memberships and Appointments:

American Chemical Society (2010)
Pennsylvania Department of Environmental Professionals (2011)

Beth A. Rubino, B.S., Senior Specialist, GC/MS Semivolatiles

Education:

B.S. Environmental Resource Management, Pennsylvania State University (1984)

Professional Experience:

Roy F. Weston, Inc., Chemist (1984-1997)
Responsibilities included extraction laboratory unit leader. Managed staff, sample flow, and scheduling on organic extractions to meet hold time requirements; trained personnel on extraction methods and SOP's; performed field sampling and field laboratory responsibilities
Performed GC/MS sample analysis of semi-volatiles, data interpretation, and instrument maintenance
RECRA Environmental, Inc, Senior Chemist (1997-2001)
Responsibilities included technical support for the GC/MS unit; managed staff, sample flow, and scheduling to meet customer's requirements; conducted training on GC/MS analysis, its software, interpretation, and procedure awareness
Lionville Laboratory, Inc, Data Lead Chemist (2001-2013)
Responsibilities included technical support for GC/MS data review and logbook quality assurance and quality control; trained personnel on MS systems and SOP's; assured compliance with client requirements; Prepared and provided accurate and timely data to clients
With Eurofins Lancaster Laboratories since 2014
Senior Specialist, GC/MS Semivolatiles (2014)
Responsibilities include performing technical audit of GC/MS semivolatiles data in a timely manner with zero defects as a goal

Robin C. Runkle, B.S., Senior Specialist, GC/MS Volatiles

Education:

B.S. Chemistry, State University of New York at Oneonta (1988)

Continuing Education:

Introduction to Mass Spectral Interpretation, Finnigan Mat (1991)
Gas Chromatography: Practical Theory and Applications for LL (1993)
HP5890 GC Troubleshooting and Maintenance, Hewlett-Packard (1993)
Technical Training, OI Analytical (1995)

Professional Experience:

With Lancaster Laboratories since 1989

Senior Chemist (1993)

Responsibilities included: sample preparation; perform GC/MS volatile testing; operate GC/MS instruments; data interpretation; review and approve data; developing and evaluating new methods; calibrating and repairing instruments; prepare standards; reagent preparation; revise and update SOPs and analytical methods; order supplies; train other analysts; and prepare and test trip blank water.

Senior Specialist, GC/MS Volatiles (2005)

Responsibilities include: data review and verification, review and sign reports, respond to and work on client inquiries and ATF requests.

Michael S. Salgado, B.S., Senior Specialist, Training

Education:

B.S. Biology, Moravian College (2010)

Professional Experience:

Light Knowledge Resources, Scientific Writing Intern (2008-2009)

Responsibilities included researching and composing articles focusing on multiple myeloma, of which many have been published on their website The Myeloma Beacon

Indiana University Bloomington, IN, Undergraduate Researcher (2009-2009)

Responsibilities included researching in a virology lab and used techniques and tools such as SDS gel electrophoresis, PCR, RT-PCR, minipreps, sequence analysis, cell transformations and transfections, sterile microbial techniques, pouring plates and media preparation, streaking, colony counts, trouble shooting skills, mixers, balances, pH meters, laminar flow hoods, autoclaves, pipettes, and maintained cultures; the research aimed to formulate a strategy to analyze the role of the Reovirus µ1 membrane penetration protein in induction of apoptosis; the data compiled will be used in further research on this virus

Godiva Chocolatier, Technical Data Entry Technician (2010-2012)

Responsibilities included analyzing ingredient, allergen, regulatory, processing, SOP, audit, packaging and quality information and then shifted the data into their work-in-progress database to aid in Godiva's product lifecycle management project; validated the data entered for the product lifecycle management project and updated database specifications when changes were made to raw material specifications; aided coworkers in different departments in becoming familiar with the new data base and data entry process; actively participated in sensory testing with the sensory team to aid in product development; took part in editing audit, guideline, specification, and safety standard documents

With Eurofins Lancaster Laboratories since 2012

Biologist, Professional Scientific Staffing – PA or NJ (2012)

Responsibilities included performing tissue culture based potency assays on live vaccine products; process intermediates and related experimental samples; prepare solutions and culture media; maintain multiple cell lines; maintain records and test results following GMP

Senior Specialist, Training (2015)

Responsibilities include facilitating Core and Elective training for new employees; conducting orientations, internal courses, and other learning experiences

Grace M. Salm, Specialist Group Leader, Data Deliverables

Continuing Education:

- Introduction to Personal Computers, Lancaster County Career and Technology Center (2000)
- Windows, Lancaster County Career and Technology Center (2000)
- PC Upgrading & Repair, Lancaster County Career and Technology Center (2000)

Professional Experience:

- With Eurofins Lancaster Laboratories since 2000
  - Data Package Administrator, GC/MS Semivolatiles (2000)
    - Responsibilities included assembling departmental data in specific order; checking in data; filing batchlogs
  - Specialist, GC/MS Semivolatiles/Data Deliverables (2006)
    - Responsibilities included performing data assembly in department 4026; assemblers and reviewers became part of department 4038; reviewing data for departments 4026, 4021, and 4030
  - Specialist Group Leader, Data Deliverables (2010)
    - Responsibilities include scheduling for data package assembly/review; following up with corrections; assembly/review for 4032, 4037, and review for 4028; following up on CSR requests; conducting performance reviews for direct reports; updating SOPs

Richard A. Shober, B.S., Principal Chemist, Pesticide Residue Analysis

Education:

- B.S. Chemistry, Muhlenberg College (1984)

Continuing Education:

- Inductively Coupled Plasma Spectroscopy, Allied Analytical (1985)
- ACS Short Course, Analytical Chemistry of Contaminants in Surface and Groundwater (1986)
- Gas Chromatography: Practical Theory & Application, Lancaster Laboratories (1994)
- Mass Spectral Interpretation, Hewlett-Packard (1995)
- Comprehensive HPLC, RESTEK (2010)

Professional Experience:

- With Lancaster Laboratories since 1984
  - Principal Chemist, Pesticide Residue Analysis (1999)
    - Responsibilities include performing pesticide residue testing; operating gas chromatography instruments; interpreting data; repairing instruments; developing new methods for and operating LC/MS/MS; developing and maintaining computer systems/programs for lab use

Awards, Citations, Honorary Societies & Publications:

- Poster paper on computer applications for analytical chemistry
- Poster paper on tobacco specific nitrosamine analysis

Biographical Listings:

- *Who's Who in Environmental Science*

Stephanie A. Selis, B.S.E., Senior Chemist, GC/MS Volatiles

Education:

- B.S.E. Biology, Chemistry Minor, Millersville University (1996)

Professional Experience:

- Access I, Access II, PC Focus (1997)
- Emergency Evacuation Coordinator (1998)
- Gas Chromatography Principles and Practices, Lancaster Laboratories University (1998)
- GC/MS Theories and Applications, MDL Systems (1999)
- Statistics, Lancaster Laboratories University (2000)
- Enlightened Leadership: Getting to the Heart of Change, Lancaster Laboratories University (2000)
- Building Relationship Versatility: Social Styles at Work, Lancaster Laboratories University (2000)
- Leadership at Lancaster Laboratories, Lancaster Laboratories University (2000)
- Introduction to Interpretation of Mass Spectra, Lancaster Laboratories University (2005)

Professional Experience:

- With Lancaster Laboratories since 1996
  - Chemist (1996)
  - Senior Chemist, Volatiles by GC (2000)
    - Responsibilities included performing sample analysis, troubleshooting, and maintenance; calibrating the system; establishing QC windows for soil analysis; writing SOPs; performing data entry; preparing standards; performing sample verification; training analysts
  - Senior Chemist, GC/MS Volatiles (2005)
    - Responsibilities include performing sample analysis; auditing maintenance notebooks; performing troubleshooting, maintenance, and system calibration; preparing standards; performing sample verification; training analysts

Richard A. Shober, B.S., Principal Chemist, Pesticide Residue Analysis

Education:
- B.S. Chemistry, Muhlenberg College (1984)

Continuing Education:
- Inductively Coupled Plasma Spectroscopy, Allied Analytical (1985)
- ACS Short Course, Analytical Chemistry of Contaminants in Surface and Groundwater (1986)
- Gas Chromatography: Practical Theory & Application, Lancaster Laboratories (1994)
- Mass Spectral Interpretation, Hewlett-Packard (1995)
- Comprehensive HPLC, RESTEK (2010)

Professional Experience:
- With Lancaster Laboratories since 1984
  - Principal Chemist, Pesticide Residue Analysis (1999)
    - Responsibilities include performing pesticide residue testing; operating gas chromatography instruments; interpreting data; repairing instruments; developing new methods for and operating LC/MS/MS; developing and maintaining computer systems/programs for lab use

Awards, Citations, Honorary Societies & Publications:
- Poster paper on computer applications for analytical chemistry
- Poster paper on tobacco specific nitrosamine analysis

Biographical Listings:
- *Who's Who in Environmental Science*

Jeffrey B. Smith, B.A., Senior Chemist Group Leader, Volatiles in Air

Education:
- B.A. Biology, University of Delaware (1991)

Professional Experience:
- Roy F. Weston, Inc., Chemist (1991-1997)
- Merck, Chemist (1997-2000)
- With Lancaster Laboratories since 2001
  - Senior Chemist, GC/MS Semivolatiles (2001)
    - Responsibilities included performing GC/MS analysis of semivolatile organics
  - Senior Chemist Group Leader, Volatiles in Air (2005)
    - Responsibilities include tracking of all incoming work and scheduling analysts; tracking all incoming summa orders and assigning to analyst; main CSR contact for group; instrument troubleshooting and maintenance; auditing and certifying data as needed

Michele J. Smith, B.S., Senior Specialist, Specialty Services Group

Education:
- B.S. Chemistry, St. Mary's College, Notre Dame, Indiana (1998)
- 22 credits master's study with Penn State University (2000-2002)

Continuing Education:
- Gas Chromatography Principles and Practices, Lancaster Laboratories University (1999)
- Statistics, Lancaster Laboratories University (2000)

Professional Experience:
- St. Mary's College, Laboratory Teaching Assistant (1996-1998)
    - Responsibilities included: assisted professor in the laboratory—responsible for experiment demonstrations, answered student's questions, and graded lab reports.
- With Lancaster Laboratories since 1998
  - Chemist (1998)
    - Responsibilities included: maintain GC/MS instrumentation, tune and calibrate GC/MS, analyze samples by GC/MS, review and assemble all supporting GC/MS data, review daily QC outliers.
  - Senior Chemist (2001)
    - Responsibilities included: maintain GC/MS instrumentation, tune and calibrate GC/MS, analyze samples by GC/MS, review and assemble all supporting GC/MS data, perform technical audit of GC/MS and HPLC, sign analysis reports, track samples to meet turnaround time.
  - Senior Chemist Coordinator (2004)
    - Responsibilities included: maintain GC/MS instrumentation, tune and calibrate GC/MS, analyze samples by GC/MS, review and assemble all supporting GC/MS data, perform technical audit of GC/MS and HPLC, sign analysis reports, track samples to meet turnaround time.
  - Senior Specialist Group Leader, GC/MS Semivolatiles (2005)
    - Responsibilities included: review and assemble GC/MS data, perform technical audit of GC/MS and HPLC, sign analysis reports, schedule and track samples to meet turnaround time.

Senior Specialist, Environmental Client Services (2008)
Responsibilities included auditing sample paperwork; setting up standard forms; generating bottle orders; preparing quotes
Senior Specialist, Specialty Services Group (2011)
Responsibilities include maintaining instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; diagnosing complex problems and offering solutions with a high degree of independence; suggesting and implementing improvements to maximize quality and productivity; acting as technical resource for internal problems and projects; assisting in "brainstorming" client problems and projects; training new employees in all aspects of instrumentation; researching new and emerging technologies

Memberships and Appointments:
American Chemical Society (1998-2002)

Angela D. Sneeringer, B.S., Senior Chemist, GC/MS Volatiles

Education:
B.S. Biochemistry, Elizabethtown College (2001)

Professional Experience:
Wyeth, Chemist (2001-2003)
Responsibilities included CIP/SIP of tanks, large volume solution formulation, record review
Cycle Chem, Technical Services Rep (2003-2005)
Responsibilities included shipping documents for hazardous waste transportation; assisting clients with all necessary paperwork; scheduling of waste pickup
With Eurofins Lancaster Laboratories since 2005
Chemist, Pharmaceutical Raw Materials (2005)
Responsibilities included performing TOC of pharmaceutical waters using OI and Sievers analyzers
Chemist, GC/MS Volatiles (2005)
Responsibilities included performing GC/MS of volatile organic compounds using Agilent 5970 series MS and Shimadzu QP5000, also OI 5660 and 5661 concentrators and autosamplers
Senior Chemist, GC/MS Volatiles (2015)
Responsibilities include maintaining GC/MS instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing the necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; performing all duties with minimal supervision; working on special assignments; diagnosing complex problems and offering solutions with a high degree of independence; assisting in "brainstorming" client problems and projects; completing assigned projects on time; researching new and emerging technologies; producing written and oral reports on research activities

Tara M. Spaide, Senior Specialist, Business Development, Environmental Sciences

Continuing Education:
Algebra and Analytical Geometry, Pennsylvania State University (1993)
Chemistry, Pennsylvania State University (1993)

Professional Experience:
With Eurofins Lancaster Laboratories since 1986
Senior Specialist Coordinator, Organic Extraction (1997)
Responsibilities included supervising personnel; scheduling lab work; managing laboratory operations; reviewing and approving data; and revising and updating analytical methods
Senior Chemist Coordinator, Organic Extraction (2003)
Responsibilities included supervising personnel; scheduling lab work; managing laboratory operations; reviewing and approving data; and revising and updating analytical methods
Senior Chemist Group Leader, Organic Extraction (2005)
Responsibilities included supervising personnel; scheduling lab work; managing laboratory operations; reviewing and approving data; and revising and updating analytical methods
Senior Specialist, Environmental Client Services (2007)
Responsibilities included auditing sample paperwork; setting up standard forms; generating bottle orders; preparing quotes
Senior Specialist, Business Development, Environmental Sciences (2015)
Responsibilities include independently securing new business consistent with operational capabilities and business plan goals; collaborating efforts and activities with those of Outside Sales account managers as needed; focusing on proposal writing for major national accounts; attending face-to-face sales meetings with selected national accounts as needed and maintaining responsibility for their maintenance and growth

Kevin A. Sposito, B.S., Senior Chemist, GC/MS Volatiles

Education:

B.S. Forensic Chemistry, York College of Pennsylvania (2009)

Professional Experience:

Analytical Lab Services, Laboratory Technician (2010)

Responsibilities included performing Liquid-Liquid extractions of water sample to isolate organic analytes of interest

With Eurofins Lancaster Laboratories since 2010

Chemist, GC/MS Volatiles (2010)

Responsibilities included maintaining GC/MS instrumentation; tuning and calibrating instruments daily; analyzing quality control and client samples; reviewing and assembling data

Senior Chemist, GC/MS Volatiles (2015)

Responsibilities include maintaining GC/MS instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing the necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; performing all duties with minimal supervision; working on special assignments; diagnosing complex problems and offering solutions with a high degree of independence; assisting in "brainstorming" client problems and projects; completing assigned projects on time; researching new and emerging technologies; producing written and oral reports on research activities

Larry D. Starkey, Senior Specialist Group Leader, Bay Area Service Center and SeaTac Service Center

Professional Experience:

Walnut Creek Honda, Utility (1987-1992)

Responsibilities included performing new car inventory, general maintenance, and vehicle repair; being a service adviser

Star Courier Service, Manager (1992-2008)

Responsibilities included being a dispatcher, accountant (AP-AR-Income Statement-Tax Prep), supervisor, and driver

With Eurofins Lancaster Laboratories since 2008

Senior Administrator, Bay Area Service Center (2008)

Responsibilities included performing courier service; ordering and inventory control of bottling room; performing preservation with acid, bottle prep, packing of samples, packing of bottle orders, sending of rush e-mails to technical department, assisting in STLC threshold, packing and shipping of hazardous materials, sub-contracting of analysis

Specialist, Bay Area Service Center (2012)

Responsibilities included handling the receipt of samples at the Bay Area Service Center; reconciling chains-of-custody and documenting any discrepancies or damages at receipt; picking up samples and delivering bottle kits in the Bay Area; packing and shipping samples via overnight courier to Eurofins Lancaster Laboratories Environmental, LLC; supporting the SeaTac and Fort Collins Service Centers

Senior Specialist Group Leader, Bay Area Service Center and SeaTac Service Center (2014)

Responsibilities include serving as the primary contact with the laboratory for a number of assigned clients; communicating technical information and conveying client requirements to laboratory personnel, ensuring that those requirements are met; managing large/complex projects according to client technical and schedule requirements; developing strong relationships with major accounts resulting in additional sales; providing courier service including bottle delivery and sample pick-up in Bay Area; assisting in start-up and stocking of other service centers; ordering supplies as needed; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow

Christopher M. Stauffer, B.S., Senior Specialist, Environment Software Development

Education:

B.S. Computer Science, Millersville University (2013)

Professional Experience:

Lawn Equipment Parts Co., Junior Network Admin (2008-2011)

Responsibilities included monitoring and maintaining network; applying software patches deployed to employees' desktops

With Eurofins Lancaster Laboratories since 2012

Specialist, Computer Application Development (2012)

Responsibilities included performing software development for Parallax

Senior Specialist, Computer Application Development (2015)

Responsibilities include providing technical support for maintenance of installed software applications and assisting with the development, installation, and maintenance of new applications for general use; assisting in development, implementation, and maintenance of software intended to improve the quality and efficiency of work performed

Memberships and Appointments:

Association for Computing Machinery

Member of SIGARCH, SIGMICRO (2011-2013)

Chelsea B. Stong, B.S., Senior Specialist, GC/MS Volatiles

Education:

B.S. Biology, Eastern University (2007)

Professional Experience:

With Eurofins Lancaster Laboratories since 2006

Laboratory Technician, GC/MS Volatiles (2006)

Responsibilities included scanning samples into LIMS; prepping samples for analysis

Chemist, GC/MS Volatiles (2007)

Responsibilities included analyzing water and soil samples using a GC/MS; prepping samples for analysis; working up raw data

Senior Chemist, GC/MS Volatiles (2012)

Responsibilities included maintaining GC/MS instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing the necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; performing all duties with minimal supervision; working on special assignments; diagnosing complex problems and offering solutions with a high degree of independence; assisting in "brainstorming" client problems and projects; completing assigned projects on time; researching new and emerging technologies; producing written and oral reports on research activities

Senior Specialist, GC/MS Volatiles (2015)

Responsibilities include performing technical audit of GC/MS volatiles data in a timely manner with zero defects as a goal; acting as a technical resource to department; evaluating issues in technical data and suggesting possible solutions, performing sample/QC verification in the LIMS; reviewing analytical reports; evaluating and interpreting analytical results; writing and revising SOPs; assisting in responding to and eliminating ICARs; making recommendations for technical improvements; communicating effectively within department; completing assigned tasks on time; assisting in "brainstorming" client problems and projects; performing all duties with minimal supervision

Andrew J. Strebel, Principal Specialist, Environmental Software Development

Continuing Education:

Advanced Aquarius Programmers Course, Hewlett-Packard (1989)
Environmental Applications of GC/MS, Indiana University (1989)
Environmental GC-MS (DOS) Operation, Hewlett-Packard (1995)
Unix Module 1, Albright College (1995)
Unix Module 2, Albright College (1995)
Unix Shell Scripts, Albright College (1995)
Unix AWK Programming, Albright College (1995)
Target Training, Thru-Put Systems, Inc. (1995)
Report Writer Training, Thru-Put Systems, Inc. (1998)
HP-UX System Administration for HP 9000s, Hewlett Packard (1998)
HP-UX Troubleshooting for HP 9000s, Hewlett Packard (1998)
GC/MS Training Course, MDL Systems (1999)
LC/MS/MS 101 Training Course, Basic Mass Spec Solutions, Inc. (2001)
GC-MSD Macro Programming, Agilent Technologies (2012)

Professional Experience:

With Eurofins Lancaster Laboratories since 1986

Technical Specialist (1991)

Chemist (1994)

Senior Chemist (1997)

Principal Chemist, GC/MS Semivolatiles (2001)

Responsibilities included performing routine semivolatile testing; operated GC/MS semivolatile instruments; data interpretation; reviewed and approved data; developing and evaluating new methods; calibrating and repairing instruments; prepared standards; revised and updated SOPs and analytical methods; trained other analysts; developed and maintained computer systems/programs for lab use; computer validation testing

Principal Specialist, Environmental Software Development (2013)

Responsibilities include special project data interpretation and review; developing and evaluating new methods for the Target data system; developing and maintaining computer systems/programs for lab use; and computer validation testing

Robert Strocko, Jr., B.S., Manager, Metals and Microbiology

Education:

B.S. Biology, York College of Pennsylvania (1988)

Continuing Education:

Thermo Jarrel l ASA ICP Course, Thermo Jarrell ASA (1993)

Professional Experience:

Springettsbury Waste Water Treatment Facility, Chemistry Technician (1986-1988)

Responsibilities included running NPDES tests on wastewater, % solids, NH4, pH, BOD, suspended solids, coliform, dissolved solids, temperature, and Hexa-Chrome testing

Penn Dairies, Laboratory Technician (1988-1989)

Responsibilities included testing raw milk for coliform bacteria for acceptance; performing milk-fat percent solids on milk products; calculating sugar content in sweetened milk

Pennsylvania Department of Environmental Resources, Chemistry Technician (1989-1992)

Responsibilities included receiving samples; logging data for analysis to computer; handling field sampling questions; operating flame AA; shipping cooler to field samples

With Eurofins Lancaster Laboratories since 1992

Chemist, Metals (1992)

Responsibilities included setting up, pouring, and running samples on ICP; reviewing and verifying ICP data; performing instrument maintenance; calculating IDLs, MDLs, and linear ranges; writing SOPs

Chemist/Coordinator, Metals (1996)

Responsibilities included overseeing prep room personnel and work flow; scheduling work flow through prep room; writing job plans and job reviews; ordering standards and reagents; overchecking notebooks

Manager, Metals (1998)

Responsibilities include overseeing technical areas in ICP, low-level mercury, ICP-MS, and mercury; writing SOPs, ICARs, etc.; writing job plans and job reviews; handling technical questions for clients/client services; verifying ICP/ICP-MS/Hg data

Manager, Metals Analysis and Microbiology (2013)

Responsibilities included overseeing technical areas in ICP, low-level mercury, ICP-MS, and mercury; writing SOPs, ICARs, etc.; writing job plans and job reviews; handling technical questions for clients/client services; verifying ICP/ICP-MS/Hg data

Manager, Metals Analysis and Microbiology (2014)

Responsibilities include included overseeing technical areas in ICP, low-level mercury, ICP-MS, and mercury; writing SOPs, ICARs, etc.; writing job plans and job reviews; handling technical questions for clients/client services; verifying ICP/ICP-MS/Hg data; overseeing technical area in Microbiology; tests include Colilert (presence/absence), Colilert (Q-tray), Heterotrophic Plate Count (HPC), Fecal Coliform by Membrane Filtration, Yeast and Mold, Hydrocarbon degraders; overseeing writing of SOPs, responding to ICARs; writing job plans and job reviews; handling technical questions for clients/client services; verifying data

Christiane S. Sweigart, B.S., Senior Specialist, Environmental Quality Assurance

Education:

B.S. Science, Elizabethtown College (1985)
Medical/Technology Degree, St. Joseph School of Medical Technology (1985)

Continuing Education:

The Principals of Gas Chromatography (1993)
Statistics Course (1993)
Creative Training Techniques Conference (1997)
SEDD/ADR Implementation Workshop (2008)
ERPTOOLSX (Environmental Resources Planning Tools) (2010)
PPI (Practical Process Improvement) - Facilitator Training (2011)

Professional Experience:

With Eurofins Lancaster Laboratories since 1985

Chemist, GC/MS (1985)

Responsibilities included GC/MS operation targeting VOA and BNA compounds, instrument maintenance, sample handling, and data handling (interpretation and documentation)

Chemist, GC/VOA (1986)

Responsibilities included GC operation targeting both aromatic and halogenated compounds, FID operation, instrument maintenance, sample handling, and data handling (interpretation and documentation); training others on FID methods, development of training/reference manual for FID, development of internal Operating Manual, standard documentation, definition and maintenance of statistically defined windows, and temporary coordinator in Department 4025

Chemist Coordinator, GC/VOA (1993)

Responsibilities included coordination of sample analysis and data management; job plans and feedback for several personnel; communication both internal and external, and data handling (interpretation and documentation; and combination of existing department with another (personnel, instrumentation, and sample volume)

Senior Specialist, Human Resources (1997)

Responsibilities included recruiting, training, and professional development

Senior Specialist, Electronic Data Deliverables (2001)

Responsibilities included EDD generation, EDD content review, and communication (internal and external)

Senior Specialist, Environmental Quality Assurance (2013)

Responsibilities include ensuring quality of operations and data being produced in the laboratories; ensuring laboratory adherence to government regulations and client requirements; independently performing complex work and special projects in addition to routine and non-routine duties

Awards, Citations, Honorary Societies & Publications:

Recognition for the implementation of a revamped New Hire Orientation (1999)
Recognition for the development and presentation of the Ethic's Refresher (2001)

Memberships & Appointments:

LCAHRM (1997-2001)

Valerie L. Tomayko, B.S., Principal Specialist, Pesticide Residue Analysis

Education:

A.S. Chemical Engineering Technology, Pennsylvania State University (1977)
B.S. Human Resource Management, Geneva College (1993)

Professional Experience:

Hercules Inc., Laboratory Technician (1977-1983)
Antech Ltd., Associate Chemist, (1985-1989)
Quanterra (formerly Wadsworth/Alert), Chemist, (1989-1997)
UEC (United States Steel Engineering Consultants), Chemist (1997)
With Lancaster Laboratories since 1997

Senior Chemist, Pesticide Residue Analysis (1997)

Responsibilities included: data interpretation; review and approve data; review data packages; and generate statistical QC limits for Pesticide Residue Analysis and Extractable Petroleum Hydrocarbons/MBC GC and Nitrosamines departments.

Senior Chemist Coordinator, Pesticide Residue Analysis (2001)

Responsibilities included: Monitor turnaround time and status of samples and packages; coordinate work flow; track employees' progress; assist in implementing procedures/protocols for meeting QA requirements, data package requirements, and special client or project-specific requests. In addition to data interpretation; review and approve data; review data packages; and generate statistical QC limits for Pesticide Residue Analysis and Extractable Petroleum Hydrocarbons/MBC GC and Nitrosamines departments.

Senior Specialist Group Leader, Pesticide Residue Analysis (2005)

Responsibilities included: Monitor turnaround time and status of samples and packages; coordinate work flow; track employees' progress; assist in implementing procedures/protocols for meeting QA requirements, data package requirements, and special client or project-specific requests. In addition to data interpretation; review and approve data; review data packages; and generate statistical QC limits for Pesticide Residue Analysis and Extractable Petroleum Hydrocarbons/MBC GC and Nitrosamines departments.

Senior Specialist Group Leader, Volatiles by GC (2006)

Responsibilities included: Monitor turnaround time and status of samples; coordinate work flow; track employees' progress; assist in implementing procedures/protocols for meeting QA requirements, data package requirements, and special client or project-specific requests. In addition to data interpretation; review and approve data; review data packages; and generate statistical QC limits for GC Volatile analysis.

Principal Specialist, Pesticide Residue Analysis (2011)

Responsibilities include reviewing laboratory data for technical compliance to methods, SOPs, client protocols, and regulatory agency requirements; overchecking and verifying data from the analysts performing instrumental analyses, including QC and clients' samples for pesticides, PCBs, herbicides, and other related compounds; reviewing data for accuracy and completeness (for routine and non-routine analyses, analytical reports, and/or data packages); assisting in implementing special client requests that impact data processing and reporting; identifying and offering solutions to correct problems related to data processing and reporting; serving as a technical resource for the department with regard to QA/QC procedures and issues

Timothy J. Trees, A.A.S., Principal Chemist, Specialty Services Group

Education:

Certificate, N.Y.S. Water/Wastewater Treatment Operations, Columbia Greene Community College (1985)
A.A.S. Environmental Control of Hazardous Waste/Water Quality, Ulster County Community College (1988)

Continuing Education:

Water Treatment Operations, NYS License Board (1984)
Wastewater Treatment Operations, NYS License Board (1986)
Varian AA Course (1992)
Service Operations Process Optimization, Pennsylvania State University (1992)
Hitachi GFAA Workshop, Hitachi, CT (1994)
24-hour HAZWOPER (spill response) (1995)
Atomic Spectroscopy Workshop, Perkin-Elmer (1997)

Professional Experience:

York Wastewater Management (1985-1986)
Rider Engineering (1986-1988)
With Eurofins Lancaster Laboratories since 1988

Senior Technician, Metals (1988)

Responsibilities included: operation, maintenance, and sample preparation of mercury cold vapor and hydride generation instrumentation for the determination of mercury, arsenic, and selenium; data entry; troubleshooting instruments; repair of instrumentations' electronic system.

Chemist I, Metals (1990)

Responsibilities included: operation and maintenance of graphite furnace instrumentation; verification of mercury cold vapor and hydride generation data; coaching and training of personnel in the operation of mercury and hydride instrumentation; troubleshooting and repair of instrumentations' mechanical and electronic system.

Chemist I/Coordinator, Metals (1992)

Responsibilities included: operation and maintenance of graphite furnace instrumentation; ICP operation; verification of mercury cold vapor and hydride generation data; coaching and training of personnel in the operation of mercury, hydride, and graphite
furnace instrumentation; troubleshooting and repair of instrumentations' mechanical and electronic system; systems operation optimization to increase production; scheduling of personnel for department operation; job plan and review with employees.

Chemist II/Coordinator, Metals (1993)

Responsibilities included: coaching and training of personnel in the operation of mercury, hydride, and graphite furnace instrumentation; assist clients with data interpretation and process improvement; ICP operation; verification of graphite furnace, mercury cold vapor, and hydride generation data; data package review; troubleshooting and repair of instrumentations' mechanical and electronic systems; system operations optimization to increase production; scheduling of personnel for department operation; job plan and review with employees.

Senior Chemist/Coordinator, Metals (1994)

Responsibilities included: operation, maintenance, repair, and troubleshooting of department graphite furnaces; flame atomic absorption, mercury cold vapor, hydride generation, and Inductively Coupled Plasma Instrumentation as well as computer systems used in the operation with these instruments; data qualification, interpretation, and verification of department workload; assist clients with interpretation of data, cause and effect; coaching and training of department personnel in areas of sample preparation, instrument setup, maintenance, and analysis using these instruments; job plan, review, and evaluation with employees; ordering of supplies; maintained operation of Metals Atomic Absorption for the department; method development for both environmental and pharmaceutical divisions for graphite furnace and ICP work; Set up and maintain, all SOPs and documentation for computer systems and instrumentation to comply with GMP regulations; data package review for metals analysis; review and verification of ICP data as needed.

Principal Chemist/Coordinator, Metals (1996)

Responsibilities included: operation, maintenance, repair, and troubleshooting of department graphite furnaces; flame atomic absorption, mercury cold vapor, hydride generation, and Inductively Coupled Plasma Instrumentation as well as computer systems used in the operation with these instruments; data qualification, interpretation, and verification of department workload; assist clients with interpretation of data, cause and effect; coaching and training of department personnel in areas of sample preparation, instrument setup, maintenance, and analysis using these instruments; job plan, review, and evaluation with employees; ordering of supplies; maintained operation of Metals Atomic Absorption for the department; method development for both environmental and pharmaceutical divisions for graphite furnace and ICP work; Set up and maintain, all SOPs and documentation for computer systems and instrumentation to comply with GMP regulations; data package review for metals analysis; review and verification of ICP data as needed.

Senior Chemist, GC/MS Semivolatiles (1998)

Responsibilities included: operation, maintenance, and troubleshooting of GC/MS instrumentation; HP5890, 6890 GC, 5971, 5972, 5973 Mass Spec; review and data interpretation of various analyses including but not limited to, 8270C, Appendix IX, 625, CLP 3/90, and 2/88; standards preparation for various methods; data interpretation and data package assembly of batch data; evaluation and review of system procedures.

Principal Chemist, GC/MS Semivolatiles (2001)

Responsibilities included: operation, maintenance, and troubleshooting of GC/MS instrumentation; HP5890, 6890 GC, 5971,5972, 5973 Mass Spec; method development, research, and development of GC/MS procedures; review and data interpretation of various analyses including but not limited to 8270C, Appendix IX, 625, CLP 3/90 and 2/88; standards preparation for various methods; data interpretation and data package assembly of batch data; evaluation and review of system procedures; analysis and troubleshooting of HPLC and analysis of PAHs; coaching and training of analysts to assist with troubleshooting; working in Pharmaceutical Method Development and Validation, operating LC/MS, LC/MS/MS, and GC/MS instrumentation, and performing instrument qualifications since June 2003

Principal Chemist, Flexible Staffing (2006)

Responsibilities included working in GC/MS Volatiles in Air department; operation, maintenance, and troubleshooting GC/MS instrumentation; HP5890, 6890 GC, 5971, 5972, 5973 Mass Spec; method development, research, and development of GC/MS procedures; review and data interpretation of various analyses including but not limited to TO-15 and TO-14; standards preparation for various methods; data interpretation and data package assembly of batch data; evaluation and review of system procedures; ability to operate a variety of instrumentation and data systems

Principal Chemist, GC/MS Semivolatiles (2007)

Responsibilities included operating, performing maintenance on, and troubleshooting GC/MS instrumentation; HP5890, 6890 GC, 5971,5972, 5973, 5975 Mass Spec; setting up and performing method development of Thermo Fisher TRACE GC and DSQ II MS; performing method development using both EI and CI mode of analysis; method development, research, and development of GC/MS procedures; review and data interpretation of various analyses including, but not limited to, 8270C, Appendix IX, 625, CLP 3/90 and 2/88; standards preparation for various methods; data interpretation and data package assembly of batch data; evaluation and review of system procedures; analysis and troubleshooting of HPLC and analysis of PAHs; coaching and training of analysts to assist with troubleshooting; Including working in GC/MS Volatiles in Air department; operation, maintenance, and troubleshooting GC/MS instrumentation; HP5890, 6890 GC, 5971, 5972, 5973 Mass Spec; method development, research, and development of GC/MS procedures; review and data interpretation of various analyses including but not limited to TO-15 and TO-14; standards preparation for various methods; data interpretation and data package assembly of batch data; evaluation and review of system procedures; ability to operate a variety of instrumentation and data systems

Principal Chemist, Specialty Services Group (2011)

Responsibilities include acting as technical resource within the environmental division; developing and validating analytical protocols; troubleshooting and solving analytical chemistry problems; optimizing instrument configuration and performance; evaluating and interpreting analytical results; writing SOPs; assisting in responding to and eliminating ICARs, assisting in optimizing procedures in prep lab; communicating effectively within department; performing routine work as required. Maintain and operation of Thermo Fisher Scientific TSQ Quantum XLS MS/MS as well as TSQ8000 MS/MS with a Trace 1310 GC; developing methods utilizing GC triple Quad technology in a variety of matrices; utilizing various extraction technologies such as QuEChERS (Quick, Easy, Cheap, Effective, Rugged, and Safe) to effectively extract and cleanup sample matrices

Holly L. Trego, M.S., Manager, Environmental Software Development

Education:

B.S. Computer Science, Millersville University (1998)
M.S. Computer Science, Pennsylvania State University (2004)

Professional Experience:

Millersville University (1994-1998)
Computer Programmer
Responsibilities included organizing meetings with staff of Academic Advising and students; maintained statistics on students' grades in the Undeclared program using SAS; created reports in Cobol to report on the statistics; organized summer orientation for the Undeclared program
Internet Programmer
Responsibilities included creating and maintaining various interactive web pages to allow students to view information; developed web site for students to vote on what classes departments should offer
With Eurofins Lancaster Laboratories since 1996
Senior Specialist, Computer Applications Development (1996)
Responsibilities included write Visual Basic code to general client reports; design Powerbuilder System with customized macros which processes analytical data; develop data acquisition software with SQL*Loader
Senior Specialist/Group Leader, Computer Applications Development (2005)
Responsibilities included managing environmental application development projects, maintenance of existing applications
Manager, Computer Applications Development (2007)
Responsibilities included managing environmental application development projects, maintenance of existing applications
Manager, Environmental Software Development (2013)
Responsibilities include managing application development projects, maintenance of existing applications

Nicole M. Veety, B.S., Senior Chemist Group Leader, Instrumental Water Quality

Education:

AA Psychology, Harrisburg Area Community College (1997)
B.S. Psychobiology, Lebanon Valley College (2000)

Professional Experience:

With Eurofins Lancaster Laboratories since 2000
Senior Technician, Instrumental Water Quality (2000)
Responsibilities included various prep analyses, data entry, TOC and TOX analyses.
Chemist, Instrumental Water Quality (2003)
Responsibilities included performing various analyses, verification, and review and revise SOPs.
Senior Chemist, Instrumental Water Quality (2006)
Responsibilities include performing various analyses, method development, verification, and review and revise SOPs.
Senior Chemist Group Leader, Instrumental Water Quality (2009)
Responsibilities include performing various analyses, method development, verification, and review and revise SOPs; acting as a technical resource, trainer, and troubleshooter; making recommendations for operational and/or technical improvements; coaching and developing direct reports; planning and monitoring workflow.

Awards, Citations, Honorary Societies, and Publications:

Phi Theta Kappa National Honor Society (Alpha Nu Omega) (1996-2000)

David Velasquez, Senior Account Manager, Environmental Sciences

Information not available at time of printing

Robert Todd Vincent, B.S., Principal Chemist, Organic Extraction

Education:

B.S. Chemistry, West Virginia Wesleyan College (2001)

Professional Experience:

With Lancaster Laboratories since 2001

Chemist, EPH/Misc. GC (2001)

Responsibilities included analyzing samples; performing equipment repair; GC method development

Chemist, Organic Extraction (2005)

Responsibilities included performing method development; equipment repair

Senior Chemist, Organic Extraction (2007)

Responsibilities included performing method development; equipment repair; vendor relations; technology evaluation

Principal Chemist, Organic Extraction (2011)

Responsibilities include performing high level, difficult preps (with minimal supervision or guidance) following standard operating procedures (SOPs); self-train in new techniques; entering information into computer; training new or existing employees in extraction techniques or use of equipment; using knowledge to actively improve current processes; developing, enhancing, and validating new extraction methods; keeping work area clean and organized; preparing spikes; repairing equipment; updating departmental SOPs and training manual; disposing of wastes in approved manner; assisting in incident prevention and remediation when necessary

Harry D. Ward, Ph.D., Principal Specialist, Training

Education:

B.S. Chemistry, Muhlenberg College (1980)

Ph.D. Organic Chemistry, University of Delaware (1985)

Professional Experience:

Armstrong World Industries, Inc., Research Scientist (1985-2003)

Responsibilities included performing research and development related to flooring

With Eurofins Lancaster Laboratories since 2003

Senior Chemist, Pharmaceutical Product Testing (2003)

Responsibilities included performing pharmaceutical product testing

Senior Chemist, Method Development & Validation (2005)

Responsibilities included performing pharmaceutical method development and validation

Senior Training Specialist, Human Resources (2006)

Responsibilities included design and delivery of core and elective technical training

Principal Training Specialist, Human Resources (2008)

Responsibilities included design and delivery of core and elective technical training

Principal Specialist Group Leader, Training (2011)

Responsibilities included managing the resources of the technical training group; designing and delivering core and elective technical training

Principal Specialist, Training (2015)

Responsibilities included facilitating all steps associated with technical training

Barbara J. Weaver, M.S., CIH, Principal Specialist, Training

Education:

B.S. Chemistry, Elizabethtown College (1971)
M.S. Analytical Chemistry, Illinois Institute of Technology (2001)

Certifications:

CIH - American Board of Industrial Hygiene - Certified in the comprehensive practice of industrial hygiene (1983), Certification #2719

Continuing Education:

Business Law, Elizabethtown College (1979)
NIOSH Course #553 "Industrial Hygiene Sampling, Decision Making, Monitoring and Record Keeping, Sampling Strategies" (1979)
Industrial Toxicology, 5-Day Workshop, Thomas Jefferson University (1980)
Special Topics: Environmental Analytical Chemistry, Graduate Work, Villanova University (1981)
"Comprehensive Industrial Hygiene Review", University of Cincinnati, NIOSH Education Resource Center (1983)
Environmental Health, Graduate Work, West Chester University (1985)
Chemical Hygiene - The OSHA Laboratory Standard, NEAIHA PDC (1990)
Health and Safety Management for Hazardous Waste Professionals, AIHA PDC #11 (1990)
Financial Accounting, Penn State (1990)
NIOSH Course #582 "Sample and Analysis of Airborne Asbestos Dust", NIOSH Education Resource Center, Cincinnati (1992)
Survey of Management, Penn State University (1993)
Laboratory Safety and Health, American Chemical Society (1994)
24-hour HAZWOPER (spill response) and Refreshers (1995-present)
Health, Safety, and Environmental Auditing, Johns Hopkins (1995)
Managing Ionizing Radiation Programs for Industrial Hygienists, AIHA (1996)
Radiation Safety Officer Training, Radiation Safety Associates, MA (1997)
Presenting Data and Information, Edward R. Tufte, Graphic Press LLC (2005)
IATA/FIATA Dangerous Goods, IATA (2007)
GC/MS Training Seminar, Restek (2008)
IATA Dangerous Goods Refresher Training, DGI (2009)
Exposure Assessment Strategies and Statistics, 4.6 CEUs, AIHA (2009)
Practical Process Improvement, Training in the Role of Facilitator (2010)
DOT (49CFR) Shipper Course, DGI (2011)
IATA Acceptance Training, all inclusive (2011)

Professional Experience:

Warner Lambert, Inc., Quality Control Chemist (1970-1973)
Responsibilities included performing USP/NF and client-specific raw materials and product testing; conducting specific project assignments such as documentation of product-specific alcohol denaturing at supplier's site; pre-market new product quality control testing; serving on panels for testing fragrance and color

Hershey Medical Center, Junior Research Technician (1973-1974)
Responsibilities included developing rubidium-crystal FID-GC (nitrogen sensitive) methods for the low level detection of barbiturates in solution and in blood extracts; performing analysis of blood and spiked blood from rat and monkey; performing analysis of a specific liver enzyme; using preparative fix-angle ultracentrifuge in sample preparation; developing electron microscopy photographs for liver cell mitochondria study

Elizabethtown College, Laboratory Instructor (1977-1978)
Responsibilities included preparing materials for freshman chemistry laboratories; providing basic laboratory instruction for freshmen; conducting research on the separation of linoleic and linolenic acids (omega-3 and omega-6 fatty acids in olive oil) using spinning band distillation; testing flame-retardant cellulose insulation to determine the flame-retardant formulation for industrial client

With Lancaster Laboratories since 1978

Chemist, Air Quality/Industrial Hygiene (1978)
Responsibilities included performing air and miscellaneous chemical analysis using gas chromatography, colorimetric analysis, UV-Vis, spectrophotometry, fiber-counting using phase contrast microscopy, and infrared analysis

Program Manager, Air Quality/Industrial Hygiene (1978)
Responsibilities for the Air Quality and Miscellaneous Chemistry Group included conducting NIOSH, OSHA, and EPA air sampling and analysis; industrial hygiene (air quality and employee exposure in the workplace) consulting services; responsibilities for laboratory work included method development for analysis of pharmaceutical active compounds in air; method development for the FID-GC analysis of cholesterol and fatty acid profiles; infra-red and gas chromatography methods; forensic sample analysis and expert witness testimony; USP/NF testing, some ASTM testing, analytical microscopy using phase contrast, fluorescence and light microscopy; preparing and/or submitting PAT and QA test samples and blanks for analysis; business development, technical writing, proposal, pricing and quote development, and client services for QA/IH; managing the industrial hygiene field sampling/consultation and industrial hygiene/miscellaneous chemistry (client special projects) lab group; maintaining DEA registration; serving as laboratory director for the AIHA analytical laboratory certification for more than 10 years

Marketing and Technical Services Specialist, Business Development (1987)
Responsibilities included inside and external business development including client visits and trade shows; serving as client services/account representative for air quality, foods, and pharmaceutical sciences; creating and tracking quotes and responses to requests for bids and proposals; continued to serve as laboratory director for the AIHA analytical laboratory certification
Principal Specialist reporting to Vice President, Environmental and Pharmaceutical Sciences (1987)
Responsibilities included technical writing, special projects, and performing Graphite Furnace Atomic Absorption for Pb and Cu in water; pesticides data entry verification; coordinating, developing, and providing technical and EHS training; providing technical support to the EHS staff; serving as interim EHS officer and the EHS liaison with our parent company; serving as Lancaster Radiation Safety Officer during the period in which Lancaster held a site NRC license; serving as a permanent member of the safety committee representing EHS training
Principal Specialist, Training (1991)
Responsibilities include coordinating, developing, and providing technical training and environmental health and safety (EHS) training; soliciting and managing grants for training programs; providing coordination for the external and continuing education programs; providing technical support for the EHS staff and continuing to represent EHS training on the safety committee

Awards, Citations, Honorary Societies & Publications:
1 publication on microscopy
1 publication on NMR and Copper-histidine
Book Review - Review of *Guidelines for Laboratory Design: Health and Safety Aspect,* ***The Synergist*** March 2002
Acknowledged in two EPA publications: Pb-Based Paint Laboratory Operations Guidelines: Analysis of Pb in Paint, Dust and Soil (EPA 747-R-92-006 May 1993) and Environmental Management Guide for Small Laboratories (EPA 233-B-98-001 July 1998)
Biographical Listings: *Who's Who in the East*, under Barbara J. Felty; *Who's Who in the Safety Profession*
2014 designated as a Fellow of the American Industrial Hygiene Association

Barbara J. Weaver, M.S., CIH, Principal Specialist, Training (continued)

Memberships and Appointments:
American Board of Industrial Hygiene (1984-present)
American Industrial Hygiene Association (AIHA) Member (1980-present), Fellow (2014 to present)
Sampling and Laboratory Analysis Committee (2001-present)
Communication and Training Methods Committee (2006-present)
AIHA - Central Pennsylvania Section, Charter Member (1981-present)
Treasurer (1981-1984, 2008-present), President-elect (1985-1986, 2002-2005), President (1986-1987, 2005-2006), Secretary (2007-2008), Membership Director (1988-1993), Director (2000-2002)
American Chemical Society (1985-present)
Chemical Health and Safety Section, Membership Committee (1992-1993)
Lancaster County Industrial Safety Council (Director 1988-1990)
Leadership Lancaster (1995)
Mentor (1999-2002), Marketing Committee (1999-2000)
Johns Hopkins NIOSH Education Resource Center Continuing Education Advisory Committee (1996-2006)
Penn State University–Lancaster Center Advisory Committee (2002–2006)
Chromatography Forum, Delaware Valley (2002-present/lifetime member)

Timothy S. Weaver, B.A., Senior Specialist, Environmental Software Development

Education:
B.A. Mathematics, Franklin & Marshall College (1996)

Professional Experience:
With Eurofins Lancaster Laboratories since 1996
Computer Specialist, Volatiles by GC (1996)
Responsibilities included programming, maintenance, and updates
Computer Specialist, Environmental Sciences (1997)
Responsibilities included disk format programming initially, followed by pesticides system and database maintenance and programming
Specialist, Computer Applications Development (2002)
Responsibilities included pesticides system and database maintenance and programming; invoice print server maintenance; LLENS program administration
Senior Specialist, Environmental Software Development (2008)
Responsibilities include pesticides system and database maintenance and programming; invoice print server maintenance; LLENS program administration

Chad Wettig, Senior Specialist Group Leader, Sample Support

Continuing Education:

Leadership at Lancaster Laboratories, LLI (2000)
Role of a Leader (parts 1-4), LLI (2007)
PPI Team Training, LLI (2009)
Microsoft Excel 2003, HACC (2011)

Professional Experience:

Landis Valley, Waiter (1995)
Responsibilities included setting up banquets; serving food; maintenance work
With Eurofins Lancaster Laboratories since 1995
Clerk II, Sample Support (1995)
Responsibilities included performing homogenization, Subsampling, preservation; operating ASRS; handling hazardous sample discard
Senior Technician, Sample Support (1998)
Responsibilities included operating ASRS; performing homogenization, preservation, volatile prep; handling hazardous sample discard
Specialist, Sample Support (1999)
Responsibilities included being the technical contact between labs and client services; investigating client issues with samples
Chemist Group Leader, Sample Support (2000)
Responsibilities included acting as a resource for Client Services, Sample Administration, and the technical departments concerning all sample questions, problems, and availability; investigating problems; setting up, and maintaining systems for special projects; assisting in ASRS hardware support; communicating with Environmental Health and Safety office concerning hazardous discard; verifying results for various analysis; performing all jobs in the department as needed including volatile prep, prescreen and dilutions; assisting with ASRS operation, preservation, homogenization, and moisture; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow; monitoring data for and supporting departmental MOS
Senior Specialist Group Leader, Sample Support (2015)
Responsibilities include acting as a resource for Client Services, Sample Administration, and the technical departments concerning all sample questions, problems, and availability; investigating problems; setting up, and maintaining systems for special projects; assisting in ASRS hardware support; communicating with Environmental Health and Safety office concerning hazardous discard; verifying results for various analysis; performing all jobs in the department as needed including volatile prep, prescreen and dilutions; assisting with ASRS operation, preservation, homogenization, and moisture; performing both technical and personnel aspects of group operations; performing work within the department or other areas as required; acting as a technical resource, trainer, and troubleshooter to specific department; making recommendations for operational and/or technical improvements; communicating effectively within the group; coaching and developing direct reports; planning and monitoring workflow; monitoring data for and supporting departmental MOS

Heather E. Williams, B.S., Senior Chemist, EPH/Miscellaneous GC

Education:

B.S. Forensic and Investigative Science, West Virginia University (2004)

Continuing Education:

Principles of Gas Chromatography, LLU (2007)

Professional Experience:

With Lancaster Laboratories since 2006
Chemist, EPH/Miscellaneous GC (2006)
Responsibilities included analyzing routine samples and their associated QC by gas chromatography for extractable petroleum products such as DRO, TPH, and other related materials; reviewing, calculating, and reporting the corresponding data and results; maintaining, optimizing, and calibrating Gas Chromatographs in an efficient and accurate manner; assisting in organization of department work, track samples, and prepare samples and standards to consistently meet turnaround time requirements
Senior Chemist, EPH/Miscellaneous GC (2008)
Responsibilities include analyzing routine samples and their associated QC by gas chromatography for extractable petroleum products such as DRO, TPH and other related materials; reviewing, interpreting, calculating, and reporting the corresponding data and results; maintaining, optimizing, and calibrating Gas Chromatographs in an efficient and accurate manner; assisting in organization of department work, tracking samples; preparing samples and standards to consistently meet turnaround time requirements; verifying sample data; corresponding with client service representatives regarding client inquiries and providing answers and solutions when problems arise; SOP writing and revising as new methods are developed; assisting with new instrument installation and set-up; participating in practical process improvements as a member of a team

Bret M. Winey, B.S., Senior Specialist, Environmental Software Development

Education:

B.S. Computer Science, Millersville University (2005)

Professional Experience:

Penn State University, College of Medicine, Programmer/Analyst (2009-2011)

Responsibilities included developing systems responsible for collecting and analyzing medical research data

Weidenhammer Systems Corp., Programmer/Analyst (2011-2012)

Responsibilities included maintaining and implementing functionality on clients' websites, using specification gathered directly from the respective client

Donegal Mutual Insurance Company, Inc., Programmer (2012-2013)

Responsibilities included maintaining existing web presentation and provide aid during transition to new website design

With Eurofins Lancaster Laboratories since 2013

Senior Specialist, Environmental Software Development (2013)

Responsibilities include providing technical support for maintenance of installed software applications and assisting with the development, installation, and maintenance of new applications for general use; assisting in development, implementation, and maintenance of software intended to improve the quality and efficiency of work performed

Meng Yu, M.S., Principal Chemist, Specialty Services Group

Education:

B.S. Chemical Engineering, Zhejiang University of Technology (1986)

Post Graduate, Biogeography and Environmental Assessment, University of Saarland (1995)

M.S. Chemistry, Catholic University of Leuven (1999)

Professional Experience:

Setsco Service Ltd, Executive Chemist (1999-2002)

Responsibilities performing EPA and USDA method development and validation for water, soil, food, and pharmaceutical materials using USP, BP, and AOAC methods; performing pesticide residue analysis using all kinds of GC

Cantest Ltd, Research Chemist (2002-2008)

Responsibilities included performing bioanalytical and food safety method development and validation; performing pesticide and drug residue method validation as per USDA, EPA, CFIA methods; UPLCMSMS, LCMSMS, LCMS and GCMS operation and maintenance

Pharmanet Inc. HSP Laboratory, Research Scientist (2008-2010)

Responsibilities included performing bioanalytical method development and validation for plasma, urine, tissue, etc.; performing LCMSMS operation, tuning, and maintenance

With Lancaster Laboratories since 2010

Principal Chemist, Specialty Services Group (2010)

Responsibilities include developing and validating new testing methods; operating and maintaining LCMSMS instruments; performing sample analyses

Memberships and Appointments:

ASMS (2010)

Holly B. Ziegler, B.S., Senior Chemist, GC/MS Semivolatiles

Education:

B.S. Forensic Chemistry, Buffalo State College (SUNY) (2006)

Professional Experience:

New York State Police, Toxicology Intern (2005-2006)

Responsibilities included performing analysis of alternative medicines using FPIA, SPE, GC/NPD, and GC/MS

With Eurofins Lancaster Laboratories since 2006

Chemist, GC/MS Volatiles (2006)

Responsibilities included analyzing soils and waters for VOAs using purge and trap and GC/MS instrumentation

Senior Chemist, GC/MS Volatiles (2010)

Responsibilities included analyzing performing GC/MS analysis of water and soil samples along with other matrices by various analytical methods such as EPA 8260B and CLP; evaluating analytical data generated; calibrating and troubleshooting GC/MS instrumentation; assisting other employees with any questions that may arise and helping to train new employees

Senior Chemist, GC/MS Semivolatiles (2011)

Responsibilities include maintaining GC/MS instrumentation; tuning and calibrating instruments daily; analyzing quality control and client samples; reviewing and assembling this data in an efficient manner with a high degree of quality to meet client requirements; working on special assignments; running 8270C, 625, THPA, and TEL methods

Memberships and Appointments:

Emergency Response Team (Hazmat technician) – LLI (2006-2011)

Michael A. Ziegler, B.S., Senior Chemist, Volatiles in Air

Education:

B.S. Molecular Biology, Clarion University of PA (2002)

Professional Experience:

With Eurofins Lancaster Laboratories since 2006

Chemist, GC/MS Volatiles (2006)

Responsibilities included maintaining GC/MS instrumentation; tuning and calibrating instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality; evaluating current organizational and analytical systems; suggesting and implementing the necessary corrective action to ensure the above can be performed in alignment with client and/or regulatory requirements; performing all duties with minimal supervision

Chemist, Volatiles in Air (2010)

Responsibilities included maintaining GC and/or GC/MS instrumentation and calibrating GC and/or GC/MS instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality to meet client requirements; performing various Airlab duties associated with sample prep and sample flow (these include, but are not limited to, sample retrieval and entry, Nitrogen tank replacement, summa can cleaning, summa/FC requests, and sample pressurization/prescreen)

Senior Chemist, Volatiles in Air (2014)

Responsibilities include maintaining GC and/or GC/MS instrumentation and calibrating GC and/or GC/MS instrument daily; analyzing quality control and client samples; reviewing and assembling data in an efficient manner with a high degree of quality to meet client requirements; performing various Airlab duties associated with sample prep and sample flow (these include, but are not limited to, sample retrieval and entry, Nitrogen tank replacement, summa can cleaning, summa/FC requests, and sample pressurization/prescreen)

Eurofins Document Reference	1-P-QM-GDL-9015382	**Revision**	5
Effective Date	Jan 18, 2016	**Status**	Effective
Historical/Local Document Number	DOD - Environmental Quality Policy Manual Appendix E		
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Document Title	Document ID	Historical Document ID	Document Owner
Level 1			
Environmental Quality Policy Manual	1-P-QM-GDL-9015377	DOD - Environmental Quality Policy Manual	4052 - Environmental Quality Assurance
Procedure Cross Reference List	1-P-QM-GDL-9015378	DOD - Environmental Quality Policy Manual Appendix A	4052 - Environmental Quality Assurance
Certifications, Accreditation, Registrations, and Contracts	1-P-QM-GDL-9015379	DOD - Environmental Quality Policy Manual Appendix B	4052 - Environmental Quality Assurance
Organizational Charts Personnel to Sign Reports	1-P-QM-GDL-9015380	DOD - Environmental Quality Policy Manual Appendix C	4052 - Environmental Quality Assurance
Personnel Qualifications and Responsibilities	1-P-QM-GDL-9015381	DOD - Environmental Quality Policy Manual Appendix D	4052 - Environmental Quality Assurance
SOPs and Analytical Methods	1-P-QM-GDL-9015382	DOD - Environmental Quality Policy Manual Appendix E	4052 - Environmental Quality Assurance
Instrument and Equipment List	1-P-QM-GDL-9015383	DOD - Environmental Quality Policy Manual Appendix F	4052 - Environmental Quality Assurance
Preventative Maintenance Schedules	1-P-QM-GDL-9015384	DOD - Environmental Quality Policy Manual Appendix G	4052 - Environmental Quality Assurance
Calibration Schedules	1-P-QM-GDL-9015385	DOD - Environmental Quality Policy Manual Appendix H	4052 - Environmental Quality Assurance
NELAP Scope of Testing	1-P-QM-GDL-9015386	DOD - Environmental Quality Policy Manual Appendix I	4052 - Environmental Quality Assurance
Quality Control Types, Frequency, and Corrective Action	1-P-QM-GDL-9015387	DOD - Environmental Quality Policy Manual Appendix J	4052 - Environmental Quality Assurance
Microbiological Testing	1-P-QM-GDL-9015388	DOD - Environmental Quality Policy Manual Appendix K	4052 - Environmental Quality Assurance
Manual Integration for ELLE	1-P-QM-GDL-9017675	Policy 0001	4052 - Environmental Quality Assurance
Laboratory Ethics and Data Integrity Policy	1-P-QM-GDL-9017679	Policy 0007	4052 - Environmental Quality Assurance
Chemical Hygiene Plan	1-P-QM-GDL-9015198	Chemical Hygiene Plan	6098 - Safety
Preparedness, Prevention, and Contingency Plan	1-P-QM-GDL-9017681	Policy 0010	6098 - Safety
Exposure Control Plan for Bloodborne Pathogens	1-P-QM-GDL-9017682	Policy 0011	6098 - Safety
Level 2			
Balance, Syringe, Pipette Verification	1-P-QM-QMA-9015389	DOD - LOM-SOP-ES-235	4052 - Environmental Quality Assurance
Bay Area Service Center Dangerous Goods Shipping Procedure	1-P-QM-QMA-9017337	LOM-SOP-ES-237	50 - Bay Area Service Center
Building Security	1-P-QM-QMA-9017366	LOM-SOP-LAB-212	6043 - Physical Services
Change Control Procedures for ELLE	1-P-QM-QMA-9028515	N/A	4052 - Environmental Quality Assurance

Document Title	Document ID	Historical Document ID	Document Owner
Level 2 (continued)			
Chromatography Integration and Documentation	1-P-QM-QMA-9017333	LOM-SOP-ES-232	4052 - Environmental Quality Assurance
Chromatography Integration and Documentation for OH VAP	1-P-QM-QMA-9022815	LOM-SOP-ES-232 (OH VAP)	4052 - Environmental Quality Assurance
Communicating Maximum Contaminant Level (MCL) Exceedances	1-P-QM-QMA-9017330	LOM-SOP-ES-227	4039 – Environmental Client Services
Compliance with Environmental GLP Regulations	1-P-QM-QMA-9022322	LOM-SOP-LAB-204 and LOM-SOP-LAB-224	4052 - Environmental Quality Assurance
Data and Record Storage, Security, Retention, Archival, and Disposal	1-P-QM-QMA-9017358	LOM-SOP-LAB-203	6047 - Office Services
Data Entry, Verification and Reporting	1-P-QM-QMA-9017322	LOM-SOP-ES-218	4052 - Environmental Quality Assurance
Demonstrations of Capability	1-P-QM-QMA-9015390	DOD - LOM-SOP-ES-238	4052 - Environmental Quality Assurance
Determining Method Detection Limits and Limits of Quantitation	1-P-QM-QMA-9017309	LOM-SOP-ES-203	4052 - Environmental Quality Assurance
E-Mail System	1-P-QM-QMA-9017360	LOM-SOP-LAB-205	9013 - Information Technology
Employee Training Program	1-P-QM-QMA-9017379	LOM-SOP-LAB-231	6047 - Office Services
Environmental Project Cycle	1-P-QM-QMA-9017338	LOM-SOP-ES-239	4052 - Environmental Quality Assurance
Establishing Control Limits	1-P-QM-QMA-9017313	LOM-SOP-ES-207	4052 - Environmental Quality Assurance
EtQ System User Account Maintenance	1-P-QM-QMA-9017380	LOM-SOP-LAB-232	6047 - Office Services
Eurofins North America E-Mail and Archiving	1-P-QM-QMA-9020074	NA	9013 - Information Technology
Facilities Operation Manual	1-P-QM-QMA-9017374	LOM-SOP-LAB-223	6043 - Physical Services
Facility Change Control Procedure	1-P-QM-QMA-9017364	LOM-SOP-LAB-209	6043 - Physical Services
Forensic Laboratory Services	1-P-QM-QMA-9017307	LOM-SOP-ES-201	4052 - Environmental Quality Assurance
Guidelines for Analytical Decision Making in Environmental Testing	1-P-QM-QMA-9021833	LOM-SOP-LAB-226	4052 - Environmental Quality Assurance
Guidelines for Writing Technical Reports	1-P-QM-QMA-9017308	LOM-SOP-ES-202	4052 - Environmental Quality Assurance
Handling of Client Technical Complaints (Investigations and Response)	1-P-QM-QMA-9017332	LOM-SOP-ES-231	4052 - Environmental Quality Assurance
HP-UX Target 3.5 Data System Accounts and Electronic Signature Security	1-P-QM-QMA-9017336	LOM-SOP-ES-236	4052 - Environmental Quality Assurance
Implementation of the Computer Services Validation Master Plan (CSVMP)	1-P-QM-QMA-9017425	LOM-SOP-VAL-210	4044 - Environmental Software Development
Insect and Rodent Control	1-P-QM-QMA-9017367	LOM-SOP-LAB-213	6043 - Physical Services
Instrument Maintenance and Calibration	1-P-QM-QMA-9017325	LOM-SOP-ES-222	4052 - Environmental Quality Assurance
Investigation and Corrective Action of Noncompliant Data	1-P-QM-QMA-9017315	LOM-SOP-ES-209	4052 - Environmental Quality Assurance

Document Title	Document ID	Historical Document ID	Document Owner
Level 2 – (continued)			
Investigation and Corrective Action Reporting for Laboratory Problems	1-P-QM-QMA-9017331	LOM-SOP-ES-230	4052 - Environmental Quality Assurance
Laboratory Housekeeping and Cleaning	1-P-QM-QMA-9017373	LOM-SOP-LAB-221	6043 - Physical Services
Laboratory Notebooks, Logbooks, and Documentation for Environmental Testing	1-P-QM-QMA-9021767	LOM-SOP-LAB-220	4052 - Environmental Quality Assurance
Laboratory Sample Analysis Record (LSAR) Documentation	1-P-QM-QMA-9017318	LOM-SOP-ES-212	4052 - Environmental Quality Assurance
Laboratory/Quality Systems Procedures Summary	1-P-QM-QMA-9033535	N/A	4052 - Environmental Quality Assurance
Legal Chain-of-Custody Documentation	1-P-QM-QMA-9017335	LOM-SOP-ES-234	4052 - Environmental Quality Assurance
Missed Holding Time Reports	1-P-QM-QMA-9017326	LOM-SOP-ES-223	4052 - Environmental Quality Assurance
Monitoring of the Volatile Organics Analysis (VOA) Storage Areas for Contamination	1-P-QM-QMA-9017311	LOM-SOP-ES-205	4052 - Environmental Quality Assurance
Monitoring Temperatures in Refrigerators, Freezers, Incubators, and Ovens Using the ETM	1-P-QM-QMA-9021509	N/A	4052 - Environmental Quality Assurance
Obtaining a Representative Environmental Solid Sample Aliquot	1-P-QM-QMA-9017334	LOM-SOP-ES-233	4052 - Environmental Quality Assurance
Procurement of Environmental Laboratory Supplies	1-P-QM-QMA-9021705	LOM-SOP-LAB-218	4052 - Environmental Quality Assurance
Proficiency Test Samples	1-P-QM-QMA-9017321	LOM-SOP-ES-216	4052 - Environmental Quality Assurance
Quarantine Soils Procedures	1-P-QM-QMA-9017317	LOM-SOP-ES-211	4052 - Environmental Quality Assurance
Reagents and Standards	1-P-QM-QMA-9017328	LOM-SOP-ES-225	4052 - Environmental Quality Assurance
Review of Legal Matters	1-P-QM-QMA-9017371	LOM-SOP-LAB-219	40 - Environmental Sciences
Sample Requisition	1-P-QM-QMA-9017312	LOM-SOP-ES-206	4052 - Environmental Quality Assurance
Subcontracting Analytical Testing	1-P-QM-QMA-9017310	LOM-SOP-ES-204	4052 - Environmental Quality Assurance
Thermometer Use and Calibration	1-P-QM-QMA-9017314	LOM-SOP-ES-208	4052 - Environmental Quality Assurance
Use and Maintenance of Reagent Water Supply	1-P-QM-QMA-9017368	LOM-SOP-LAB-214	4052 - Environmental Quality Assurance
Utilizing the Services and Support of the Computer Systems Group	1-P-QM-QMA-9017362	LOM-SOP-LAB-207	9013 - Information Technology
Validation and Authorization of Analytical Methods	1-P-QM-QMA-9017329	LOM-SOP-ES-226	4052 - Environmental Quality Assurance
Windows Network and Computer Accounts	1-P-QM-QMA-9017361	LOM-SOP-LAB-206	9013 - Information Technology
Writing and Reviewing Lancaster Laboratories Policies and Operating Procedures	1-P-QM-QMA-9017356	LOM-SOP-LAB-201	6047 - Office Services

Document Title	Document ID	Historical Document ID	Document Owner
Level 3 – Environmental Microbiology			
2% Brilliant Green Bile Broth (for Coliform Test Dept. 02)	1-P-QM-WI -9018027	SOP-PM-001, Media 400	3002 - Environmental Microbiology
Biological Reaction Activity Test	1-P-QM-WI -9032790	Analysis 13697, 13698, 13699	3002 - Environmental Microbiology
Coliform Analysis - Presence/Absence and MPN	1-P-QM-WI -9014018	Analysis 6477, 6479, 8161, 13666, 13668, 13669, 13671	3002 - Environmental Microbiology
EC Medium – for Dept. 02	1-P-QM-WI -9018028	SOP-PM-001, Media 401	3002 - Environmental Microbiology
Free Chlorine Residual Data Records (Optional Total Chlorine Reading)	1-P-QM-WI -9011681	Analysis 0308	3002 - Environmental Microbiology
Hexadecane HC Emulsion (for HC degrading PC study)	1-P-QM-WI -9018016	SOP-PM-001, Media 382	3002 - Environmental Microbiology
Hydrocarbon Degrading Plate Count Study Waters and Solids	1-P-QM-WI -9013997	Analysis 6157, 6158	3002 - Environmental Microbiology
Lauryl Sulfate Tryptose Broth (1x LST) Single Strength – for Dept. 02	1-P-QM-WI -9018025	SOP-PM-001, Media 398	3002 - Environmental Microbiology
Lauryl Sulfate Tryptose Double Strength (2x LST) – for Dept. 02	1-P-QM-WI -9018026	SOP-PM-001, Media 399	3002 - Environmental Microbiology
M-FC (for Dept. 02)	1-P-QM-WI -9018024	SOP-PM-001, Media 397	3002 - Environmental Microbiology
Modification DPD Free Chlorine Residual In Water (Presence/Absence)	1-P-QM-WI -9011686	Analysis 0416	3002 - Environmental Microbiology
Modification Fecal Coliform by Membrane Filtration	1-P-QM-WI -9011598	Analysis 0199, 11028	3002 - Environmental Microbiology
MS/Agar Noble Base (for HC degrading PC study)	1-P-QM-WI -9018021	SOP-PM-001, Media 390	3002 - Environmental Microbiology
MS/Agar Noble Medium (for HC degrading PC study for Dept. 02)	1-P-QM-WI -9018022	SOP-PM-001, Media 391	3002 - Environmental Microbiology
Pour Plate Analysis - Heterotrophic Plate Count and Yeast/Mold	1-P-QM-WI -9011658	Analysis 0307, 4196, 12833, 13667, 13670	3002 - Environmental Microbiology
Quanti-Tray X Sealer	1-P-QM-PRO-9017534	OMC-PM-078	3002 - Environmental Microbiology
Tryptic Soy Broth (TSB) for Dept. 02 Sterility Checks	1-P-QM-WI -9018035	SOP-PM-001, Media 409	3002 - Environmental Microbiology
Tryptic Soy Broth (TSB)—for Dept. 02	1-P-QM-WI -9018023	SOP-PM-001, Media 396	3002 - Environmental Microbiology
Level 3 – Environmental Sciences			
Calibrating the 1-uL Standard Delivery Groove on the Archon Model 5100A and O.I. 4660 Autosampler Systems	1-P-QM-PRO-9017815	SOP-OR-075	4021 - GC/MS Volatiles
Determination of GRO by GC in Waters and Wastewaters by Method 8015B, 8015C, 8015D	1-P-QM-WI -9015131	Analysis DOD - 1635, 1636, 1728, 1729, 2762, 2763, 8229, 8268, 10598	4021 - GC/MS Volatiles
Determination of GRO by GC in Waters and Wastewaters by Method AK101	1-P-QM-WI -9013129	Analysis 1438, 1440	4021 - GC/MS Volatiles
Determination of Volatile Gasoline Range Organics in Soil and Water - Northwest GX Method	1-P-QM-WI -9013411	Analysis 2005, 2006, 8273, 8274	4021 - GC/MS Volatiles
Determination of Volatile Gasoline Range Organics in Soil and Water Maine Method	1-P-QM-WI -9012774	Analysis 10438, 10439	4021 - GC/MS Volatiles

Document Title	Document ID	Historical Document ID	Document Owner
Level 3 – Environmental Sciences (continued)			
Determination of Volatile Gasoline Range Organics in Soil and Water Oklahoma Method	1-P-QM-WI -9013441	Analysis 2315, 8789	4021 - GC/MS Volatiles
Determination of Volatile Target Compounds and Gasoline Range Organics (GRO) by Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS) in Waters and Wastewaters by Method 8260C	1-P-QM-WI -9013078	Analysis 11996, 11997, 13130	4021 - GC/MS Volatiles
Determination of Volatile Target Compounds and Gasoline Range Organics (GRO) by GC/MS in Soils and Solids by Method 8260B	1-P-QM-WI -9012764	Analysis 10237, 10607, 10949, 10950, 10951	4021 - GC/MS Volatiles
Determination of Volatile Target Compounds and Gasoline Range Organics (GRO) by GC/MS in Soils and Solids by Method 8260C	1-P-QM-WI -9013077	Analysis 11995	4021 - GC/MS Volatiles
Determination of Volatile Target Compounds and Gasoline Range Organics (GRO) by GCMS in Waters and Wastewaters by Method 8260B	1-P-QM-WI -9015141	Analysis DOD - 2898, 10335, 10943, 10945	4021 - GC/MS Volatiles
Determination of Volatile Target Compounds by Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS) in Waters and Wastewaters by Method 6200B	1-P-QM-WI -9015099	Analysis 10460	4021 - GC/MS Volatiles
Gasoline Range Organics (GRO) in Soils using Purge and Trap Gas Chromatography by SW-846, Method 8015B or SW-846, Method 8015C, or SW-846, Method 8015D	1-P-QM-WI -9015132	Analysis DOD - 1637, 1638, 1700, 1725, 1726, 2765, 2766, 5550, 5551, 10599, 12989	4021 - GC/MS Volatiles
GC and GC/MS Instrumentation Maintenance	1-P-QM-PRO-9015467	DOD - SOP-MS-004	4021 - GC/MS Volatiles
GC/MS Volatile Standards Traceability	1-P-QM-PRO-9015469	DOD - SOP-MS-006	4021 - GC/MS Volatiles
GC/MS Volatiles Audit Process	1-P-QM-PRO-9015471	DOD - SOP-MS-012	4021 - GC/MS Volatiles
Glassware Cleaning	1-P-QM-PRO-9015465	DOD - SOP-MS-001	4021 - GC/MS Volatiles
GRO in Soils for South Carolina	1-P-QM-WI -9012790	Analysis 10654	4021 - GC/MS Volatiles
GRO in Water for South Carolina	1-P-QM-WI -9012789	Analysis 10653	4021 - GC/MS Volatiles
Level II Review of GS/MS Volatiles	1-P-QM-PRO-9017810	SOP-MS-017	4021 - GC/MS Volatiles
Low Concentration Waters for Volatile Organic Analysis	1-P-QM-WI -9015153	Analysis DOD - 4914	4021 - GC/MS Volatiles
Method AK101 for the Determination of Gasoline Range Organics in Soil Analysis for the State of Alaska	1-P-QM-WI -9013134	Analysis 1450, 1451	4021 - GC/MS Volatiles
Preparation and Analysis of Cleaning Blanks for GC and GC/MS Volatiles	1-P-QM-PRO-9015470	DOD - SOP-MS-007	4021 - GC/MS Volatiles
Preparation and Testing of Storage Blanks for GC/MS Volatile Analysis	1-P-QM-PRO-9015473	DOD - SOP-MS-015	4021 - GC/MS Volatiles
Preparation and Testing of Trip Blanks for GC/MS Volatile Analyses	1-P-QM-PRO-9015466	DOD - SOP-MS-002	4021 - GC/MS Volatiles
Preparation of Oil Samples	1-P-QM-WI -9015068	Analysis DOD - 0373	4021 - GC/MS Volatiles
Preservation and Residual Chlorine Checks of Samples for GC/MS Volatile Water Analysis	1-P-QM-PRO-9015468	DOD - SOP-MS-005	4021 - GC/MS Volatiles
Purgeable Aromatics in High-Level Soils by Method 8021B	1-P-QM-WI -9015190	Analysis DOD - 8179	4021 - GC/MS Volatiles
Purgeable Aromatics in Water Samples by Method 602	1-P-QM-WI -9014655	Analysis 8241	4021 - GC/MS Volatiles
Purgeable Aromatics in Water Samples by Method 8021B	1-P-QM-WI -9015135	Analysis DOD - 2102, 6464, 8806	4021 - GC/MS Volatiles
Statistical Calculations Used in the Analysis of Samples by EPA Methodology	1-P-QM-PRO-9015491	DOD - SOP-OR-020	4021 - GC/MS Volatiles
Targeted Library Search by GC/MS	1-P-QM-WI -9013053	Analysis 11660	4021 - GC/MS Volatiles

Document Title	Document ID	Historical Document ID	Document Owner
Level 3 – Environmental Sciences (continued)			
The Determination of 1,2,3- Trichloropropane by Gas Chromatography/ Mass Spectrometry (GC/MS) using Isotope Dilution and Selective Ion Monitoring (SIM)	1-P-QM-WI -9012867	Analysis 11017	4021 - GC/MS Volatiles
The Determination of 1,4-Dioxane by Gas Chromatography/Mass Spectrometry (GC/MS) using Isotope Dilution and Selective Ion Monitoring (SIM)	1-P-QM-WI -9015075	Analysis DOD - 0527, 10326	4021 - GC/MS Volatiles
The Determination of Ethylene Oxide and Crotonaldehyde by Gas Chromatography/Mass Spectrometry (GC/MS) in Water and Soil by SW-846 Method 8260B	1-P-QM-WI -9014003	Analysis 6372, 6377	4021 - GC/MS Volatiles
The Determination of Vinyl Chloride and Carbon Disulfide by Gas Chromatography/Mass Spectrometry (GC/MS) using Selective Ion Monitoring (SIM)	1-P-QM-WI -9013992	Analysis 6008	4021 - GC/MS Volatiles
The Determination of Vinyl Chloride, Trichloroethene and Tetrachloroethene by Gas Chromatography /Mass Spectrometry (GC/MS) using Selective Ion Monitoring (SIM)	1-P-QM-WI -9013082	Analysis 12030	4021 - GC/MS Volatiles
The Determination of Volatile Organic Compounds in Wastewater by Isotope Dilution and Gas Chromatography/Mass Spectrometry (GC/MS)	1-P-QM-WI -9015136	Analysis 2394, 2417	4021 - GC/MS Volatiles
Toxicity Characteristic Leachate Procedure (TCLP); Determination of Volatile Target Compounds by GCMS in Zero Headspace Extractions (ZHE)	1-P-QM-WI -9015142	Analysis DOD - 3636	4021 - GC/MS Volatiles
Use of 40-mL Vials for Volatile Organic Analyses	1-P-QM-PRO-9015474	DOD - SOP-MS-016	4021 - GC/MS Volatiles
Volatile Compounds in Aqueous and Solid Samples by SW-846 8260B for OH VAP	1-P-QM-WI -9012739	Analysis 10237, 10335 OH VAP	4021 - GC/MS Volatiles
Volatile Organics Tentatively Identified Compound Method	1-P-QM-WI -9015084	Analysis DOD - 0890, 0880, 12028	4021 - GC/MS Volatiles
Volatile Organics Tentatively Identified Compound Method (Interpretive)	1-P-QM-WI -9012746	Analysis 0882, 0884, 12027	4021 - GC/MS Volatiles
Waters for Purgeable Organic Compounds by Capillary Column Gas Chromatography Mass Spectrometry	1-P-QM-WI -9015143	Analysis DOD - 3648	4021 - GC/MS Volatiles
Waters for Volatile Organic Compounds by Purge and Trap Gas Chromatography/Mass Spectrometry using EPA Method 624	1-P-QM-WI -9015097	Analysis DOD - 10371	4021 - GC/MS Volatiles
3030 C, Treatment for Acid-Extractable Metals for North Carolina Groundwater Samples	1-P-QM-WI -9013465	Analysis 2812, 10651, 11988, 11989	4022 - Metals
Bottletop Dispensers	1-P-QM-PRO-9015404	DOD - MC-IO-019	4022 - Metals
Digestion of Aqueous Samples by SW-846 3005A for ICP Analysis – OH VAP	1-P-QM-WI -9024237	Analysis 1848 OH VAP	4022 - Metals
Digestion of Aqueous Samples by SW-846 3010A for ICP Analysis – OH VAP	1-P-QM-WI -9024239	Analysis 5705 OH VAP	4022 - Metals
Digestion of Aqueous Samples by SW846 Method 3020A/3010A Modified for Analysis by ICP/MS for OH VAP	1-P-QM-WI -9022821	6050 OH VAP	4022 - Metals
Digestion of Aqueous Samples by SW-846 Method 7470A for OH VAP	1-P-QM-WI -9013986	Analysis 5713 OH VAP	4022 - Metals
Digestion of Aqueous Samples by SW-846 Method 7470A, EPA 254.1	1-P-QM-WI -9015082	Analysis DOD - 5713, 5714	4022 - Metals

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Digestion of Non-Aqueous Samples by SW-846 Method 3050B for OH VAP	1-P-QM-WI -9013983	Analysis 5708, 10637, 11026, 11027 OH VAP	4022 - Metals
Digestion of Solid Samples by SW-846 Method 7471A - OH VAP	1-P-QM-WI -9013985	Analysis 5711 OH VAP	4022 - Metals
Dilute/Run and AVS/SEM Sample Handling for Metals	1-P-QM-WI -9013476	Analysis 4792, 13449	4022 - Metals
Fixed-Volume Hand-Held Pipettes	1-P-QM-PRO-9015403	DOD - MC-IO-003	4022 - Metals
Glassware Cleaning	1-P-QM-PRO-9015463	DOD - SOP-IO-013	4022 - Metals
Langelier Index in Water	1-P-QM-WI -9012744	Analysis 0576	4022 - Metals
Low Level Mercury by EPA Method 1631 Revision E in Waters Using Cold Vapor Atomic Fluorescence Spectrometry	1-P-QM-WI -9013144	Analysis 1573, 1574	4022 - Metals
Maintenance and Calibration of HACH Model 2100N Laboratory Turbidimeter	1-P-QM-PRO-9017427	MC-IO-017	4022 - Metals
Mercury in Aqueous and Solid Samples by SW-846 Method 7470A (Aqueous) and 7471A (Solid) for OH VAP	1-P-QM-WI -9011649	Analysis 0259, 0159 OH VAP	4022 - Metals
Mercury in Aqueous, Solid and Tissue Samples by Cold Vapor AA	1-P-QM-WI -9015067	Analysis DOD - 0259, 0159	4022 - Metals
Metals by ICP for Methods SW-846 6010B/C (aqueous, solid, tissue) and EPA 200.7(aqueous)	1-P-QM-WI -9018442	Analysis 6966, 1643, 6935, 7914, 6946, 6947, 1650, 6949, 6952, 6951, 6953, 1654, 1662, 1656, 1657, 6958, 6960, 1667, 6961,10145, 6955, 6944, 6936, 6969, 7968, …	4022 - Metals
Metals by Inductively Coupled Plasma Mass Spectrometry for SW-846 Methods 6020/6020A (aqueous, solid, tissue) and EPA 200.8 (aqueous)	1-P-QM-WI -9018443	Analysis 6142, 6123, 6125, 10801, 6126, 6127, 6129, 6128, 6132, 6131, 6133, 6134, 6140, 6136, 6137, 6138, 6143, 6139, 6135, 6124, 6141, 6146, 6144, 6147, 6145, …	4022 - Metals
Metals Use of the LLENS System	1-P-QM-PRO-9015464	DOD - SOP-IO-036	4022 - Metals
Sample Prep of Sediments, Sludges, Soils, and Tissues by SW846 3050B for Analysis of Metals by ICP and ICP-MS	1-P-QM-WI -9015160	Analysis DOD - 5708, 10637	4022 - Metals
Sample Preparation of Leachates and Other Wastewater for Analysis of Total Metals by Inductively Coupled Plasma-Mass Spectrometer (ICP-MS)	1-P-QM-WI -9015165	Analysis DOD - 6050, 10639	4022 - Metals
Sample Preparation of Oils for Analysis of Metals by Inductively Coupled Plasma Spectroscopy	1-P-QM-WI -9015091	Analysis DOD - 1015	4022 - Metals
Sample Preparation of Potable Water, Groundwater, Surface Water, and Wastewater for Analysis of Total Recoverable Metals by ICP (5716)	1-P-QM-WI -9013987	Analysis 5716	4022 - Metals
Sample Preparation of Potable Water, Groundwater, Surface Water, and Wastewater for Analysis of Total Recoverable Metals by ICPMS (7050)	1-P-QM-WI -9014042	Analysis 7050	4022 - Metals

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Sample Preparation of Soil, Sediment, Sludge, Oils, and Tissues for Total Mercury Analysis by Atomic Absorption Cold Vapor Technique	1-P-QM-WI -9015161	Analysis DOD - 5711, 10638	4022 - Metals
Sample Preparation of Wastewater and Leachates for Analysis of Total Metals by Inductively Coupled Plasma Atomic Emission Spectrometry	1-P-QM-WI -9015159	Analysis DOD - 5705, 10636	4022 - Metals
Sample Preparation of Waters for Analysis of Total Recoverable Metals by Inductively Coupled Plasma Optical Emission Spectrometry	1-P-QM-WI -9015133	Analysis DOD - 1848, 10635	4022 - Metals
Trace Metals in Aqueous and Non-Aqueous Samples by Method SW-846 6010B for OH VAP	1-P-QM-WI -9022822	7066, 6966, 1743, 1643, 7035, 6935, 7046, 6946, 7047, 6947, 1750, 1650, 7049, 6949, 7052, 6952, 7051, 6951, 7053, 6953, 1754, 1654, 1762, 1662, 7058, 6958, 1767, 1667, 7061, 6961, 7055, 6955, 7044, 6944, 7036, 6936, 7022, 6925, 7071, 6971, 7072,... OH VAP	4022 - Metals
Trace Metals in Aqueous and Non-Aqueous Samples by Method SW-846 6020 for OH VAP	1-P-QM-WI -9022820	6127, 6027, 6131, 6031, 6137, 6037, 6139, 6039, 6133, 6033, 6125, 6142, 6042, 6128, 6028, 6124, 6024, 6126, 6026, 6145, 6045, 6135, 6035 OH VAP	4022 - Metals
Undigested Sample Preparation of Potable Water for Analysis of Total Recoverable Metals by Inductively Coupled Plasma Mass Spectrometry [ICP-MS]	1-P-QM-WI -9013994	Analysis 6051, 5281	4022 - Metals
Analysis of Chlorinated Herbicides by 8151A in Water	1-P-QM-WI -9015088	Analysis DOD - 0952, 10407	4024 - Pesticide Residue Analysis
Analysis of Pesticides by 8081B in Solid Samples using GC-ECD	1-P-QM-WI -9015108	Analysis DOD - 10590	4024 - Pesticide Residue Analysis
Analysis of Polychlorinated Biphenyls (PCBs) by 8082A in Aqueous Samples using GC-ECD	1-P-QM-WI -9015109	Analysis DOD - 10591, 13092	4024 - Pesticide Residue Analysis
Captan and Captafol by Method 8081A in Waters and Solids using GC-ECD	1-P-QM-WI -9013435	Analysis 2257, 2253	4024 - Pesticide Residue Analysis
Chlorinated Acids in Water Using GC-ECD by Method 515.1	1-P-QM-WI -9013405	Analysis 1864	4024 - Pesticide Residue Analysis
Chlorinated Herbicides by 8151A in Solids by GC-ECD	1-P-QM-WI -9015158	Analysis DOD - 10401	4024 - Pesticide Residue Analysis
Common Equations Used During Chromatographic Analyses	1-P-QM-PRO-9015501	DOD - SOP-PP-040	4024 - Pesticide Residue Analysis
Creating Calibration Timed Events in Chrom Perfect	1-P-QM-PRO-9018227	SOP-PP-036	4024 - Pesticide Residue Analysis
Data Audit Procedure for Department 4024	1-P-QM-PRO-9018224	SOP-PP-023	4024 - Pesticide Residue Analysis
Determination of Picric Acid in Soil Samples by HPLC with UV	1-P-QM-WI -9012797	Analysis 10709	4024 - Pesticide Residue Analysis
EDB, DBCP and TCP by Method 8011 in Solids using Microextraction and GC-ECD	1-P-QM-WI -9025366	Analysis 13214	4024 - Pesticide Residue Analysis
EDB/DBCP and TCP by Method 504.1 or 8011 in Waters using Microextraction and GC-ECD	1-P-QM-WI -9015094	Analysis DOD - 1034, 7934, 10398	4024 - Pesticide Residue Analysis
Extraction By Method 8318/8318A for Carbamate and Urea Pesticides in Solids	1-P-QM-WI -9013140	Analysis 1510, 11143	4024 - Pesticide Residue Analysis

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Extraction for Perchlorate by Method 6850 in Solids	1-P-QM-WI -9015167	Analysis DOD - 6568	4024 - Pesticide Residue Analysis
Extraction of Chlorinated Acids and Herbicides in Drinking Water by Method 515.1	1-P-QM-WI -9014002	Analysis 6369	4024 - Pesticide Residue Analysis
Extraction of Chlorinated Herbicides in a Soil Matrix	1-P-QM-WI -9013472	Analysis 4181	4024 - Pesticide Residue Analysis
Extraction of Chlorinated Herbicides in a Water Matrix by SW-846 8151A	1-P-QM-WI -9015078	Analysis DOD - 0816, 11110, 11111	4024 - Pesticide Residue Analysis
Extraction of Formaldehyde and Other Aldehydes in a Water by Method 8315A	1-P-QM-WI -9015090	Analysis DOD - 1013, 11124, 12857	4024 - Pesticide Residue Analysis
Extraction of Nitroaromatics and Nitroamines by Method 8330/A/B in Water	1-P-QM-WI -9015171	Analysis DOD - 6915, 11122, 11125, 13432	4024 - Pesticide Residue Analysis
Extraction Procedure for the Determination of Formaldehyde and Aldehydes in a Solid Matrix	1-P-QM-WI -9015162	Analysis DOD - 5876, 11139	4024 - Pesticide Residue Analysis
Formaldehyde and Other Aldehydes by Method 8315A in Aqueous and Solid Samples using HPLC	1-P-QM-WI -9013471	Analysis 8044, 8045, 12856, 13022, 13031	4024 - Pesticide Residue Analysis
Interpretation of Chromatographic Data	1-P-QM-PRO-9015494	DOD - SOP-PP-011	4024 - Pesticide Residue Analysis
Liquid/Liquid Extraction Procedure for the Determination of Organophosphorous Pesticides in a Wastewater Matrix	1-P-QM-WI -9012765	Analysis 10240	4024 - Pesticide Residue Analysis
Low Level PCBs in Water by Method 8082/8082A using GC-ECD	1-P-QM-WI -9013081	Analysis 12013, 12686	4024 - Pesticide Residue Analysis
Medium Level Sonic Probe Extraction Procedure for the Determination of Pesticides and PCBs in a Solid Matrix	1-P-QM-WI -9012745	Analysis 0819M, 11144	4024 - Pesticide Residue Analysis
Microextraction by Method 504.1 or 8011 for EDB, DBCP, and TCP in Water	1-P-QM-WI -9014309	Analysis 7786, 13715	4024 - Pesticide Residue Analysis
Microextraction of EDB, DBCP, and TCP in Solids by Method 8011	1-P-QM-WI -9025371	Analysis 13218	4024 - Pesticide Residue Analysis
Micromass Quattro Micro Tandem Mass Spectrometer with a Waters 2795 HPLC System (LC/MS/MS)	1-P-QM-PRO-9018230	SOP-PP-042	4024 - Pesticide Residue Analysis
Microwave Extraction Method 3546 for PCBs in a Solid Matrix	1-P-QM-WI -9015104	Analysis DOD - 10497, 11140, 13100	4024 - Pesticide Residue Analysis
Microwave Extraction Method 3546 for Pesticides in a Solid Matrix	1-P-QM-WI -9015103	Analysis DOD - 10496, 11141	4024 - Pesticide Residue Analysis
Microwave Extraction of Pesticides and PCBs in Non-aqueous Samples by SW-846 Method 3546 for OH VAP	1-P-QM-WI -9022433	Analysis 10496, 10497 OH VAP	4024 - Pesticide Residue Analysis
Monitoring QC Data Acceptance Limits	1-P-QM-PRO-9015496	DOD - SOP-PP-025	4024 - Pesticide Residue Analysis
Nitroaromatics and Nitroamines by Method 8330B in Water and Solids using HPLC with UV Detection	1-P-QM-WI -9029396	Analysis DOD - 13395, 13413	4024 - Pesticide Residue Analysis
Nitroaromatics and Nitroamines in Water and Solids by HPLC with UV Detection by Method 8330(A)	1-P-QM-WI -9015172	Analysis DOD - 6916, 6918, 10595, 10596, 10131, 10132	4024 - Pesticide Residue Analysis
Nitrogen and Phosphorus Containing Pesticides by EPA Method 507 in Water using GC-NPD	1-P-QM-WI -9013407	Analysis 1870	4024 - Pesticide Residue Analysis
N-Methylcarbamate Pesticides by Method 8318 / 8318A in Solids	1-P-QM-WI -9013139	Analysis 1509, 10597	4024 - Pesticide Residue Analysis
N-Methylcarbamates by Method 531.1 in Groundwater and Drinking Water using High Performance Liquid Chromatography (HPLC)	1-P-QM-WI -9013126	Analysis 1340	4024 - Pesticide Residue Analysis

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OP Pesticides (Acephate and Methamidophos) by 8141A in Aqueous and Solid Samples using GC-NPD	1-P-QM-WI -9013395	Analysis 1782, 1785	4024 - Pesticide Residue Analysis
Organic Acids in Water by Methods 8015B/D or 8321B using HPLC/UV	1-P-QM-WI -9015063	Analysis 8843, 12737, 13947	4024 - Pesticide Residue Analysis
Organophosphorous Pesticides by Method 8141A/8141B in Solid Samples using GC-NPD	1-P-QM-WI -9015157	Analysis DOD - 5367, 10408, 10594, 13178, 13184	4024 - Pesticide Residue Analysis
Organophosphorous Pesticides by Methods 8141A/8141B/622 in Aqueous Samples using GC-NPD	1-P-QM-WI -9015156	Analysis DOD - 5366, 10410, 10593, 12144, 13182, 13186	4024 - Pesticide Residue Analysis
Passive In-Situ Chemical Extraction Sampler (PISCES) Procedure for the Determination of Polychlorinated Biphenyls (PCBs)	1-P-QM-WI -9013121	Analysis 12801	4024 - Pesticide Residue Analysis
PCBs in Oil by SW-846 Method 8082	1-P-QM-WI -9011597	Analysis 0174	4024 - Pesticide Residue Analysis
Perchlorate by Method 6850 in Waters and Solids by LC/MS/MS	1-P-QM-WI -9015166	Analysis DOD - 6386, 6557	4024 - Pesticide Residue Analysis
Pesticide Extract Cleanup Using Gel Permeation Chromatography	1-P-QM-PRO-9015407	DOD - MC-OE-004	4024 - Pesticide Residue Analysis
Pesticides by Method 8081A in Solid Samples using GC-ECD	1-P-QM-WI -9015128	Analysis DOD - 1363, 1420, 4225, 10738, 13237	4024 - Pesticide Residue Analysis
Pesticides in Aqueous and Non-aqueous Samples by SW-846 Method 8081A for OH VAP	1-P-QM-WI -9022430	Analysis 0177, 1363, 10738 OH VAP	4024 - Pesticide Residue Analysis
Pesticides in Aqueous Samples by Method 608	1-P-QM-WI -9014174	Analysis 7572	4024 - Pesticide Residue Analysis
Pesticides in Water by Method 8081A using GC-ECD	1-P-QM-WI -9015066	Analysis DOD - 0177, 0950, 0180, 1954	4024 - Pesticide Residue Analysis
Pesticides in Water by Method 8081B using GC-ECD	1-P-QM-WI -9015107	Analysis DOD - 10589, 10647	4024 - Pesticide Residue Analysis
Picric Acid in Water by Method 8015B Using HPLC with UV Detection	1-P-QM-WI -9013439	Analysis 2265	4024 - Pesticide Residue Analysis
Polychlorinated Biphenyls (PCBs) by Method 608 or 8082 in Waters	1-P-QM-WI -9015164	Analysis DOD - 6030, 10227	4024 - Pesticide Residue Analysis
Polychlorinated Biphenyls (PCBs) by Method 8082 in Solids and Wipes	1-P-QM-WI -9015126	Analysis DOD - 0042, 1030, 6011, 7512, 10225, 10736, 10906, 12800, 13236	4024 - Pesticide Residue Analysis
Polychlorinated Biphenyls (PCBs) in Aqueous and Non-aqueous Samples by SW-846 Method 8082 for OH VAP	1-P-QM-WI -9022429	Analysis 10225, 10227, 10736 OH VAP	4024 - Pesticide Residue Analysis
Polychlorinated Biphenyls (PCBs) in Solid Samples by 8082A Using GC-ECD	1-P-QM-WI -9015110	Analysis DOD - 10592, 10885, 12718, 13099, 13219, 13713	4024 - Pesticide Residue Analysis
Prescreening Water and Soil Samples for Pesticides and PCBs	1-P-QM-PRO-9018229	SOP-PP-041	4024 - Pesticide Residue Analysis
Preventative and Corrective GC Maintenance	1-P-QM-PRO-9015495	DOD - SOP-PP-013	4024 - Pesticide Residue Analysis
Preventative and Corrective HPLC Maintenance for the Pesticide Residue Analysis Department	1-P-QM-PRO-9015497	DOD - SOP-PP-029	4024 - Pesticide Residue Analysis
QC Data Acceptability and Corrective Action	1-P-QM-PRO-9015493	DOD - SOP-PP-002	4024 - Pesticide Residue Analysis

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Separatory Funnel Extraction by Method 3510C, 608 or 622 for Pesticides and PCBs in a Wastewater	1-P-QM-WI -9015079	Analysis DOD - 6654, 10241, 11112, 11113, 11114, 11116, 11117, 11118, 11119, 11120, 11121, 11123, 11126, 11960, 12026, 12822, 13086, 13093, 13183, 13187	4024 - Pesticide Residue Analysis
Separatory Funnel Extraction of Pesticides and PCBs in Aqueous Samples by SW-846 Method 3510C for OH VAP	1-P-QM-WI -9022427	Analysis 11117, 11118 OH VAP	4024 - Pesticide Residue Analysis
Separatory Funnel Extraction Procedure for the Determination of Chlorinated Pesticides; Nitrogen and Phosphorus Containing Pesticides; and PCBs in a Drinking Water Matrix	1-P-QM-WI -9014001	Analysis 6368, 11127	4024 - Pesticide Residue Analysis
Setting Retention Time Windows	1-P-QM-PRO-9018226	SOP-PP-035	4024 - Pesticide Residue Analysis
Setting Up Analysis Numbers in the Departmental Database	1-P-QM-PRO-9018228	SOP-PP-037	4024 - Pesticide Residue Analysis
Setting Up Single Component Initial Calibrations	1-P-QM-PRO-9015498	DOD - SOP-PP-031	4024 - Pesticide Residue Analysis
Sonic Probe Extraction for the Determination of Pesticides in a Solid Matrix	1-P-QM-WI -9015163	Analysis DOD - 11129, 11131, 11134	4024 - Pesticide Residue Analysis
Sonic Probe Extraction of Pesticides and PCBs in Solid Samples by SW-846 Method 3550C for OH VAP	1-P-QM-WI -9022432	Analysis 0819, 11134 OH VAP	4024 - Pesticide Residue Analysis
Sonic Probe Extraction Procedure for the Determination of Polychlorinated Biphenyls (PCBs) in a Solid Matrix	1-P-QM-WI -9015081	Analysis DOD - 0819, 11128, 11132, 11135	4024 - Pesticide Residue Analysis
Sonication Extraction of Nitroaromatics and Nitroamines by Method 8330/A/B in Soilds	1-P-QM-WI -9015173	Analysis DOD - 6917, 11137, 11138, 13433	4024 - Pesticide Residue Analysis
Soxhlet Extraction (Method 3540C) for Triazine Herbicides and Organophosphorous Pesticides in a Solid Matrix	1-P-QM-WI -9015170	Analysis DOD - 6677, 11130, 11133, 11142, 13181, 13185	4024 - Pesticide Residue Analysis
Standards Preparation, Coding, and Storage	1-P-QM-PRO-9018222	SOP-PP-021	4024 - Pesticide Residue Analysis
Standards Traceability and Monitoring	1-P-QM-PRO-9018220	SOP-PP-003	4024 - Pesticide Residue Analysis
Uploading Data to the LIMS	1-P-QM-PRO-9018225	SOP-PP-027	4024 - Pesticide Residue Analysis
Using "Datalog" Software for Data Acquisition of Multicomponent Pesticides/PCBs	1-P-QM-PRO-9015499	DOD - SOP-PP-032	4024 - Pesticide Residue Analysis
Using "Datalog" Software for Single-component Data Acquisition	1-P-QM-PRO-9015500	DOD - SOP-PP-033	4024 - Pesticide Residue Analysis
Waste Dilution Procedure for the Determination of PCBs in Oil	1-P-QM-WI -9015077	Analysis DOD - 0815	4024 - Pesticide Residue Analysis
Waste Dilution Procedure for the Determination of Pesticides and PCBs in a Non-Water Soluble Leachate Matrix	1-P-QM-WI -9015080	Analysis DOD - 11114DIL	4024 - Pesticide Residue Analysis
Analysis of Chlorinated Herbicides in Water by Selective Ion Monitoring Gas Chromatography/Mass Spectroscopy (SIM/GC/MS)	1-P-QM-WI -9013416	Analysis 2026	4026 - GC/MS Semivolatiles
Determination of Benz(a)pyrene in Smokeless Tobacco by Selective Ion Monitoring Gas Chromatography/Mass Spectrometry (SIM/GC/MS)	1-P-QM-WI -9014169	Analysis 7325, 0089	4026 - GC/MS Semivolatiles

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Determination of N-Nitrosodimethylamine (NDMA) in Water and Soil by EPA 1625C	1-P-QM-WI -9012803	Analysis 10962, 11622	4026 - GC/MS Semivolatiles
Determination of Priority Pollutants by Method 625	1-P-QM-WI -9015093	Analysis DOD - 10334, 2783	4026 - GC/MS Semivolatiles
Determination of Tetraethyl Lead (TEL) and Tetramethyl Lead (TML) by GC/MS Analysis	1-P-QM-WI -9015145	Analysis DOD - 4220, 4221	4026 - GC/MS Semivolatiles
Dioxin Screening (2,3,7,8-TCDD) of Aqueous and Solid Matrices using GC-MS SIM	1-P-QM-WI -9015072	Analysis DOD - 0382, 1196	4026 - GC/MS Semivolatiles
Extraction of Semi-Volatile Organic Compounds by Method 525.2 in Drinking Waters	1-P-QM-WI -9015152	Analysis DOD - 4894	4026 - GC/MS Semivolatiles
Extraction Procedure for the Determination of 2-Chlrorbenzalmalonotrile (CS) and 3-Quinuclidinyl Benzilate (BZ) in Water and Wastewater	1-P-QM-WI -9012779	Analysis 10475	4026 - GC/MS Semivolatiles
Extraction Procedure for the Determination of PAHs in an XAD Air Tube Sample by TO-15A	1-P-QM-WI -9014491	Analysis 7806AIR	4026 - GC/MS Semivolatiles
GC/MS Audit Process	1-P-QM-PRO-9015455	DOD - SOP-EX-009	4026 - GC/MS Semivolatiles
GC/MS Electronic Data Management and Handling	1-P-QM-PRO-9015453	DOD - SOP-EX-006	4026 - GC/MS Semivolatiles
GC/MS Preventative and Corrective Maintenance	1-P-QM-PRO-9015393	DOD - MC-EX-001	4026 - GC/MS Semivolatiles
Liquid/Liquid Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables in a Wastewater Matrix by Method 8270	1-P-QM-WI -9015098	Analysis DOD - 10458	4026 - GC/MS Semivolatiles
Liquid/Liquid Extraction Procedure for the Determination of Neutral Extractables in a Wastewater Matrix	1-P-QM-WI -9013043	Analysis 11629	4026 - GC/MS Semivolatiles
Liquid-Liquid Extraction Procedure for the Determination of Target Compound List Analytes in a Water Matrix	1-P-QM-WI -9015147	Analysis DOD - 4606	4026 - GC/MS Semivolatiles
Low-Level Sonic Probe Extraction Procedure by Method 3550C for the Determination of Semivolatiles in a Solid Matrix	1-P-QM-WI -9015070	Analysis DOD - 0381, 10478, 10480, 10483, 10486, 10487L	4026 - GC/MS Semivolatiles
Low-Level Sonic Probe Extraction Procedure for the Determination of Target Compound List Analytes in a Solid Matrix	1-P-QM-WI -9015148	Analysis DOD - 4607	4026 - GC/MS Semivolatiles
Low-Level Sonication Extraction Procedure for the Determination of Polynuclear Aromatic Hydrocarbons (PAHs) in a Solid Matrix by GC/MS	1-P-QM-WI -9014490	Analysis 7806	4026 - GC/MS Semivolatiles
Microwave Extraction by Method 3546 for Semivolatiles	1-P-QM-WI -9015105	Analysis DOD - 10498, 10809, 10810, 10811, 10812, 10813, 10814, 11630, 11916	4026 - GC/MS Semivolatiles
Microwave Extraction for the Determination of Semivolatiles in a Solid Matrix	1-P-QM-WI -9012780	Analysis 10481, 11598	4026 - GC/MS Semivolatiles
Microwave Extraction of Semivolatiles in Non-Aqueous Samples by SW-846 Method 3546 for OH VAP	1-P-QM-WI -9022475	Analysis 10813 OH VAP	4026 - GC/MS Semivolatiles
Monitoring QC Data Acceptance Limits	1-P-QM-PRO-9015457	DOD - SOP-EX-020	4026 - GC/MS Semivolatiles
Pesticide Extract Cleanup Using Gel Permeation Chromatography for OH VAP	1-P-QM-PRO-9023663	N/A	4026 - GC/MS Semivolatiles
Quality Control Spike Mix Verification	1-P-QM-PRO-9015454	DOD - SOP-EX-008	4026 - GC/MS Semivolatiles

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Semivolatile Compounds by Method 525.2 in Drinking Water using GC/MS	1-P-QM-WI -9015092	Analysis DOD - 10333	4026 - GC/MS Semivolatiles
Semivolatile Extract Cleanup Using Gel Permeation Chromatography	1-P-QM-PRO-9015406	DOD - MC-OE-003	4026 - GC/MS Semivolatiles
Semivolatile Extract Cleanup Using Gel Permeation Chromatography for OH VAP	1-P-QM-PRO-9023664	N/A	4026 - GC/MS Semivolatiles
Semivolatile Organic Compounds by Method 8270D in Aqueous and Non-Aqueous Matrices using GC-MS	1-P-QM-WI -9015100	Analysis DOD - 10461, 10462, 10726	4026 - GC/MS Semivolatiles
Semivolatile Organic Compounds in Aqueous and Non-Aqueous Samples by Method SW-846 8270C for OH VAP	1-P-QM-WI -9022474	Analysis 1309, 10723 OH VAP	4026 - GC/MS Semivolatiles
Semivolatile Organic Compounds, Including DRO/ORO, by Method 8270C in Aqueous and Non-Aqueous Matrices Using GC-MS	1-P-QM-WI -9015087	Analysis DOD - 0949, 1309, 1476, 1536, 1946, 1947, 1953, 2035, 2395, 4615, 4678, 4688, 6387, 6397, 7804, 7805, 10032, 10723, 10724, 10727, 10728, 13615, 13618	4026 - GC/MS Semivolatiles
Semivolatile Organics Tentatively Identified Compound Method	1-P-QM-WI -9015083	Analysis DOD - 0885, 0886, 0887, 0893, 7125, 12126	4026 - GC/MS Semivolatiles
Semivolatile Run/Injection Log Generation	1-P-QM-PRO-9015456	DOD - SOP-EX-019	4026 - GC/MS Semivolatiles
Semivolatile Spiking and Calibration Standards	1-P-QM-PRO-9015452	DOD - SOP-EX-001	4026 - GC/MS Semivolatiles
Semivolatiles by Methods 8270C/D SIM	1-P-QM-WI -9015192	Analysis DOD - 8357, 0038, 0039, 10010, 10137, 10138, 10725, 11915, 11917, 12969, 12970, 12971	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction (Method 3510C) or Waste Dilution (Method 3580A) of Base Neutrals and Acid Extractables in Leachates	1-P-QM-WI -9015149	Analysis DOD - 4731	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction by Method 3510C for BNAs in Wastewater	1-P-QM-WI -9015076	Analysis DOD - 0813, 11010, 11015, 10464, 10467, 10476	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction by Method 3510C for Tetraethyl Lead in Waters	1-P-QM-WI -9015101	Analysis DOD - 10472	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction for the Determination of PAHs in Water by GC/MS Using Method 3510C	1-P-QM-WI -9015185	Analysis DOD - 7807	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables by SIM in a Wastewater Matrix	1-P-QM-WI -9015121	Analysis DOD - 11012, 10465, 10466, 10470, 10471, 11912	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables in a Wastewater Matrix by Method 625	1-P-QM-WI -9015188	Analysis DOD - 8108, 10463	4026 - GC/MS Semivolatiles
Separatory Funnel Extraction Semivolatile Organic Compounds in an Aqueous Samples by SW-846 Method 3510C for OH VAP	1-P-QM-WI -9022472	Analysis 10464 OH VAP	4026 - GC/MS Semivolatiles
Solid Phase Extraction Procedure for the Determination of THPA, THPI and PA in a Water Matrix	1-P-QM-WI -9012865	Analysis 11011	4026 - GC/MS Semivolatiles
Sonic Probe Extraction Procedure for the Determination of Semivolatiles in a Complex Matrix	1-P-QM-WI -9015189	Analysis DOD - 8108TJ	4026 - GC/MS Semivolatiles

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Sonic Probe Extraction Procedure for the Determination of Semivolatiles in a Solid Matrix by SIM	1-P-QM-WI -9015102	Analysis DOD - 10479, 10484, 10489, 11914	4026 - GC/MS Semivolatiles
Sonic Probe Extraction Procedure for the Determination of Semivolatiles in Non-Aqueous Samples by SW-846 Method 3550C for OH VAP	1-P-QM-WI -9022476	Analysis 0381 10478 OH VAP	4026 - GC/MS Semivolatiles
The Determination of d-Limonene in Plastic by Gas Chromatography/Mass Spectrometry (GC/MS)	1-P-QM-WI -9012761	Analysis 10215	4026 - GC/MS Semivolatiles
The Determination of Semivolatiles by Large Volume Injection (LVI) Gas Chromatography/Mass Spectrometry (GC/MS)	1-P-QM-WI -9014025	Analysis 6570	4026 - GC/MS Semivolatiles
THPA, THPI and PA by 8270C Mod. or CEPH 440 in Waters and Solids Using GC/MS	1-P-QM-WI -9013141	Analysis 1542, 2345	4026 - GC/MS Semivolatiles
Waste Dilution Procedure for the Determination of Acid Extractables and Base-Neutrals in a Non-Water Soluble Leachate Matrix	1-P-QM-WI -9015150	Analysis DOD - 4731DIL	4026 - GC/MS Semivolatiles
Waste Dilution Procedure for the Determination of Acid Extractables and Base-Neutrals in a Non-Water Soluble Matrix	1-P-QM-WI -9015071	Analysis DOD - 0381DIL	4026 - GC/MS Semivolatiles
Accusterilizer - Steam Sterilizer	1-P-QM-PRO-9015400	DOD - MC-IC-008	4027 - Instrumental Water Quality
Automated Determination of Ammonia Nitrogen in Water and Wastewater Using Segmented Flow Analysis and Gas Diffusion by EPA 350.1	1-P-QM-PRO-9020808	Analysis 12892, 13000	4027 - Instrumental Water Quality
Automated Determination of Phenols in Water, Wastewater, and Soils By Automated Flow Analyzer EPA 420.4, EPA 420.2, SW-846, 9066	1-P-QM-WI -9011690	Analysis 0434, 2393, 5912	4027 - Instrumental Water Quality
Automated Determination of Total Kjeldahl Nitrogen in Water, Wastewater, and Solids	1-P-QM-WI -9011633	Analysis 0217, 1511, 0223, 4235, 6165	4027 - Instrumental Water Quality
Department 4027 Chemical Inventory and Review Procedures	1-P-QM-PRO-9015460	DOD - SOP-IC-016	4027 - Instrumental Water Quality
Determination of Hexavalent Chromium by Ion Chromatography in Solids and Waters SW-846 7199 and EPA 218.6	1-P-QM-WI -9013989	Analysis 5892, 6467	4027 - Instrumental Water Quality
Determination of Inorganic Anions by Ion Chromatography	1-P-QM-WI -9011637	Analysis 0224, 0228, 0332, 0368, 1504, 1505, 1506, 7322, 7332, 7333, 7334, 7335, 7336, 7337, 7338	4027 - Instrumental Water Quality
Determination of Inorganic Anions by Ion Chromatography (Department of Defense)	1-P-QM-WI -9015115	Analysis DOD - 10697, 10698, 10699, 10700, 10701, 10702, 10703	4027 - Instrumental Water Quality
Determination of Nitrocellulose in Water and Soil	1-P-QM-WI -9011683	Analysis 0370, 0371, 1105, 1106	4027 - Instrumental Water Quality
Determination of Perchlorate by Ion Chromatography	1-P-QM-WI -9013993	Analysis 6019, 10130, 10147	4027 - Instrumental Water Quality
Determination of TOC and TC in Solids and Sludges by Combustion	1-P-QM-WI -9013418	Analysis 2079, 0383, 6623, 10065, 11356, 11763	4027 - Instrumental Water Quality
Determination of Total and Amenable Cyanide in Water, Wastewater, and Soils, Free Cyanide in Water and Wastewater, Reactive Cyanide of Solids, and Weak Acid Dissociable Cyanide in Waters and Soils	1-P-QM-WI -9011646	Analysis 0237, 1123, 1549, 5895, 5898, 8255, 0241, 4814, 0961, 0957, 0959	4027 - Instrumental Water Quality

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Determination of Total and Available Cyanide in Water using Amperometric Detection by ASTM D 7511-09e2 and Method OIA-1677-09	1-P-QM-WI -9013123	Analysis 12823, 12941, 12999	4027 - Instrumental Water Quality
Determination of Total and Soluble Phosphorus in Water, Wastewater, and Soils (Colorimetric, Ascorbic Acid, Automated)	1-P-QM-WI -9011640	Analysis 0227, 0345, 1546, 5893, 5894, 13463	4027 - Instrumental Water Quality
Determination of Total Carbon in Water and Wastewater	1-P-QM-WI -9013142	Analysis 1550	4027 - Instrumental Water Quality
Determination of Total Cyanide in Water, Wastewater, and Soils (Department of Defense) SW-846 9012B, SW-846 9012A	1-P-QM-WI -9015116	Analysis DOD - 10704, 10705	4027 - Instrumental Water Quality
Determination of Total Organic Carbon in Water and Wastewater (Quadruplicate Studies)	1-P-QM-WI -9011682	Analysis 0354	4027 - Instrumental Water Quality
Determination of Total Organic Carbon, Dissolved Organic Carbon, and Inorganic Carbon in Water and Wastewater	1-P-QM-WI -9011651	Analysis 0273, 6090, 7547	4027 - Instrumental Water Quality
Digestion of Total and Soluble Phosphorus in Water, Wastewater, and Soils EPA 361.1, SM20 4500 P B, and SM20 4500 P E	1-P-QM-WI -9014675	Analysis 8261, 8262, 8263, 8264, 8895, 13464	4027 - Instrumental Water Quality
Hexavalent Chromium (Cr VI) in Aqueous and Non-aqueous Samples by Method SW-846 7199 for OH VAP	1-P-QM-WI -9022443	Analysis 5892, 6467 OH VAP	4027 - Instrumental Water Quality
ICS-1000, ICS 1100, ICS-2000 and ICS-3000 Ion Chromatography Systems	1-P-QM-PRO-9015402	DOD - MC-IC-010	4027 - Instrumental Water Quality
Low Level Hexavalent Chromium by Ion Chromatography in Solids and Waters	1-P-QM-WI -9029677	Analysis 12868	4027 - Instrumental Water Quality
Maintenance and Calibration of A.I. Scientific AIM600 Digestor	1-P-QM-PRO-9015397	DOD - MC-IC-005	4027 - Instrumental Water Quality
Maintenance of Continuous Flow Analyzers	1-P-QM-PRO-9015399	DOD - MC-IC-007	4027 - Instrumental Water Quality
Maintenance of the OI Analytical Model 1030 Total Organic Carbon Analyzer	1-P-QM-PRO-9015398	DOD - MC-IC-006	4027 - Instrumental Water Quality
Maintenance of the OI Analytical Total Organic Carbon Solids Analyzer	1-P-QM-PRO-9015461	DOD - SOP-IC-017	4027 - Instrumental Water Quality
Moisture by Sartorius Moisture Analyzer/Moisture by Mettler Toledo HB43 SM20 2540 G	1-P-QM-WI -9013422	Analysis 2111, 2118, 2121	4027 - Instrumental Water Quality
Nitrate Nitrogen in Water and Wastewater (Colorimetric, Automated Cadmium Reduction)	1-P-QM-WI -9011635	Analysis 0220, 7882, 5992	4027 - Instrumental Water Quality
Nitrite Nitrogen in Water and Wastewater (Colorimetric, Automated)	1-P-QM-WI -9011634	Analysis 0219, 5991	4027 - Instrumental Water Quality
pH Electrodes and Meters	1-P-QM-PRO-9015396	DOD - MC-IC-003	4027 - Instrumental Water Quality
Phenol Distillation (as Preparation for Analysis on the Flow Analyzer)	1-P-QM-WI -9011693	Analysis 0491, 5911, 8123	4027 - Instrumental Water Quality
Quality Control for Auto-Analyzer Analyses Performed in Instrumental Water Quality	1-P-QM-PRO-9015459	DOD - SOP-IC-004	4027 - Instrumental Water Quality
Reagent Water Extraction (as Preparation for Analysis on the Ion Chromatograph or Autoanalyzer)	1-P-QM-WI -9013127	Analysis 1352, 10129	4027 - Instrumental Water Quality
Total and Amenable Cyanide Distillation (As Preparation for Analysis on the Automatic Flow Analyzer)	1-P-QM-WI -9011694	Analysis 0492, 1548, 5896, 5897, 8256, 0956, 0958	4027 - Instrumental Water Quality
Total Cyanide Analysis of Waters and Solids by Massachusetts Contingency Plan (MCP)/NJ DKQP	1-P-QM-WI -9012873	Analysis 11151	4027 - Instrumental Water Quality
Total Cyanide Distillation (Department of Defense)	1-P-QM-WI -9015117	Analysis DOD - 10706, 10707	4027 - Instrumental Water Quality

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Total Kjeldahl Nitrogen Digestion of Solids and Soils (a preparation for Analysis #1511)	1-P-QM-WI -9013138	Analysis 1465	4027 - Instrumental Water Quality
Total Kjeldahl Nitrogen Digestion of Water and Wastewater (A Preparation for Analysis 0217)	1-P-QM-WI -9013136	Analysis 1460	4027 - Instrumental Water Quality
Weak Acid Dissociable Cyanide Distillation (as Preparation for Analysis on the Flow Analyzer)	1-P-QM-WI -9014171	Analysis 7528, 0960	4027 - Instrumental Water Quality
Calibration of the Leachate Tumblers	1-P-QM-PRO-9015416	DOD - MC-TL-002	4028 - Leachate Preparation
Cation Exchange Capacity of Soils (Sodium Acetate) by Method 9081	1-P-QM-WI -9015138	Analysis DOD - 2595	4028 - Leachate Preparation
Food and Tissue Preparation	1-P-QM-WI -9015137	Analysis DOD - 2487	4028 - Leachate Preparation
Glassware Cleaning for Leachate Extractions	1-P-QM-PRO-9015525	DOD - SOP-TL-001	4028 - Leachate Preparation
Leachate Blank Evaluations	1-P-QM-PRO-9015526	DOD - SOP-TL-002	4028 - Leachate Preparation
Manually Pressurized Zero Headspace Extractor (ZHE)	1-P-QM-PRO-9015528	DOD - SOP-TL-004	4028 - Leachate Preparation
pH Meters and Probes	1-P-QM-PRO-9015415	DOD - MC-TL-001	4028 - Leachate Preparation
Procedure for Calculating and Reporting Weighted Average Results for TCLP Extracts	1-P-QM-PRO-9015529	DOD - SOP-TL-005	4028 - Leachate Preparation
Shake Extraction of Solid Waste with Water ASTM Method #D3987-85	1-P-QM-WI -9015074	Analysis DOD - 0447	4028 - Leachate Preparation
Subsampling and Preservation of Leachates	1-P-QM-PRO-9015527	DOD - SOP-TL-003	4028 - Leachate Preparation
Synthetic Precipitation Leaching Procedure (SPLP) for Nonvolatile Leachates	1-P-QM-WI -9015130	Analysis DOD - 1567	4028 - Leachate Preparation
Synthetic Precipitation Leaching Procedure (SPLP) Zero Headspace Leachates	1-P-QM-WI -9015194	Analysis DOD - 8792, 1339	4028 - Leachate Preparation
Toxicity Characteristic Leaching Procedure TCLP Nonvolatile Leachates	1-P-QM-WI -9015086	Analysis DOD - 0947, 1339	4028 - Leachate Preparation
Toxicity Characteristic Leaching Procedure TCLP Zero Headspace Leachates, Method 1311	1-P-QM-WI -9015085	Analysis DOD - 0946, 2573, 0075	4028 - Leachate Preparation
Waste Extraction Test Leaching Procedure for Volatile and Non-volatile Analytes	1-P-QM-WI -9015129	Analysis DOD - 1435, 1436	4028 - Leachate Preparation
#1443 Specific Gravity by SM 2710 F #6569 Bulk Density by ASTM E868-82 Sec 9.9 Modified	1-P-QM-WI -9013131	Analysis 1443, 6569	4029 - Water Quality
Accumet Model AB30 pH/Ion/Conductivity Meter	1-P-QM-PRO-9015419	DOD - MC-WQ-004	4029 - Water Quality
Acid Volatile Sulfide in Solids	1-P-QM-WI -9013392	Analysis 1630	4029 - Water Quality
Adjustable Volume Handheld Pipettes	1-P-QM-PRO-9015426	DOD - MC-WQ-014	4029 - Water Quality
Ammonia Nitrogen by Ion-Selective Electrode Method (ISE) in Solids by EPA 350.3 (Modified) and SM 4500-NH3B-1997	1-P-QM-WI -9012763	Analysis 10222, 10696	4029 - Water Quality
Ammonia-Nitrogen for Soils (Tritrimetric Distillation Procedure) by 4500-NH3 B/C (Modified)-1997, or EPA 350.2 (Modified)	1-P-QM-WI -9012743	Analysis 0573	4029 - Water Quality
Ammonia-Nitrogen for Waters (Titrimetric Distillation Procedure) by 4500-NH3 B/C (Modified)-1997, or EPA 350.2	1-P-QM-WI -9011636	Analysis 0221	4029 - Water Quality

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Analysis of Conductivity, Alkalinity, pH, Temperature of pH, Fluoride, Turbidity, Total Hardness, Carbonate, Bicarbonate, and Ammonia by Either Man-Tech Multi-Parameter System or Manual Technique	1-P-QM-WI -9013112	Analysis 12145, 12146, 12147, 12148, 12149, 12150, 12151, 12152, 12677, 12678, 12679	4029 - Water Quality
Bellack Distillation for Fluoride in Waters and Solids by SM 4500 F B–1997 or EPA 340.1 Procedure 6.1	1-P-QM-WI -9013133	Analysis 1448	4029 - Water Quality
BOD by SM 5210 B-2001 or EPA 405.1 and CBOD by SM 5210 B–2001 in Waters	1-P-QM-WI -9011645	Analysis 0235, 1364	4029 - Water Quality
Calibration of Hach 2100AN Turbidimeter	1-P-QM-PRO-9015423	DOD - MC-WQ-010	4029 - Water Quality
Chemical Oxygen Demand (COD) (Dichromate Reflux Method) (Titrimetric, Mid-Level)	1-P-QM-WI -9011644	Analysis 0234	4029 - Water Quality
Chemical Oxygen Demand (COD) (Dichromatic Reflux Method) (Colorimetric)	1-P-QM-WI -9013470	Analysis 4001	4029 - Water Quality
Chemical Oxygen Demand (Low-Level) by 410.4	1-P-QM-WI -9032852	Analysis 13700	4029 - Water Quality
Chemical Review	1-P-QM-PRO-9015534	DOD - SOP-WQ-016	4029 - Water Quality
Chloride (Titrimetric Determination) by SM 4500-Cl C-1997	1-P-QM-WI -9013035	Analysis 1124	4029 - Water Quality
Chlorine Residual by 4500 Cl F-2000, or EPA 330.4	1-P-QM-WI -9011648	Analysis 0240	4029 - Water Quality
Color by 2120 B-2001, or EPA 110.2	1-P-QM-WI -9011653	Analysis 0277	4029 - Water Quality
Colorimetric Sulfide in Waters (#0230), Sulfide as H2S (#10293 Calculation), Dissolved Sulfide in Waters (#10499) by 4500-S2 B/C/D-2000, 4500-S2 F-2000, or EPA 376.2	1-P-QM-WI -9011642	Analysis 0230, 10293, 10499	4029 - Water Quality
Determination of Flash Point for Liquids and Solids	1-P-QM-WI -9011689	Analysis 0430	4029 - Water Quality
Digestion Procedure for the Determination of Hexavalent Chromium (Cr VI) Digestion of Non-aqueous Samples by Method SW-846 3060A for OH VAP	1-P-QM-WI -9022448	Analysis 7825 OH VAP	4029 - Water Quality
Dissolved Oxygen (Membrane Electrode) by 4500 O G-2001 or EPA 360.1	1-P-QM-WI -9011688	Analysis 0428	4029 - Water Quality
Dissolved Silica (Colorimetric) by SM4500SiO2 C-1997 or EPA 370.1	1-P-QM-WI -9012742	Analysis 0559	4029 - Water Quality
Equipment Incubators and Refrigerators	1-P-QM-PRO-9015420	DOD - MC-WQ-006	4029 - Water Quality
Equipment Muffle Furnaces and Ovens	1-P-QM-PRO-9015422	DOD - MC-WQ-009	4029 - Water Quality
Ferrous Iron By Method 3500-Fe B (Modified) - 1997	1-P-QM-WI -9015060	Analysis 8344	4029 - Water Quality
Fixed Dissolved Solids (Calculation)	1-P-QM-WI -9011628	Analysis 0210	4029 - Water Quality
Fixed Suspended Solids (Gravimetric) (#207) Volatile Suspended Solids (Gravimetric) (#208) by SM 2540 E - 1997	1-P-QM-WI -9011626	Analysis 0207, 0208	4029 - Water Quality
Fixed Volume Hand-Held Pipettes	1-P-QM-PRO-9015425	DOD - MC-WQ-013	4029 - Water Quality
Flash Point for Liquids and Solids by ASTM Method D93-07 - ERPIMS	1-P-QM-WI -9035589	Analysis 0430 ERPIMS	4029 - Water Quality
Hach DR 2800 Spectrophotometer	1-P-QM-PRO-9015427	DOD - MC-WQ-017	4029 - Water Quality
Hexane Extractable Material (HEM) and Silica Gel Treated Hexane Extractable Materials (SGT-HEM) in Waters by EPA Method 1664A and 1664B	1-P-QM-WI -9014492	Analysis 8079, 8078, 0612	4029 - Water Quality
Hexavalent Chromium (Colorimetric) by SW-846 7196A	1-P-QM-WI -9011652	Analysis 0276	4029 - Water Quality

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Hexavalent Chromium (Colorimetric) in Waters by CTRCP	1-P-QM-WI -9013410	Analysis 1968	4029 - Water Quality
Hexavalent Chromium (Colorimetric) in Waters by MCP	1-P-QM-WI -9012870	Analysis 11145	4029 - Water Quality
Hexavalent Chromium (Colorimetric) in Waters by SM846 7196A NJ DKQP	1-P-QM-WI -9029546	Analysis 13447	4029 - Water Quality
Hexavalent Chromium in Soilds (Alkaline Digestion and Analysis Methods) by SW846 3060A, SW846 7196A NJ DKQP	1-P-QM-WI -9029548	Analysis 13431	4029 - Water Quality
Hexavalent Chromium in Solids (Alkaline Digestion and Analysis Methods)	1-P-QM-WI -9011687	Analysis 0425, 7825, 2432	4029 - Water Quality
Hexavalent Chromium in Solids by Alkaline Digestion and Analysis Methods (Department of Defense)	1-P-QM-WI -9015114	Analysis DOD - 10679, 7825	4029 - Water Quality
Hexavalent Chromium in Solids by CTRCP (Alkaline Digestion and Analysis Methods)	1-P-QM-WI -9013409	Analysis 1962, 7825	4029 - Water Quality
Hexavalent Chromium in Solids by MCP (Alkaline Digestion and Analysis Methods)	1-P-QM-WI -9012871	Analysis 11146	4029 - Water Quality
Hexavalent Chromium in Waters (Colorimetric) (Department of Defense)	1-P-QM-WI -9015113	Analysis DOD - 10678	4029 - Water Quality
Ignitability of Solids by 40 CFR, Part 261.21	1-P-QM-WI -9012741	Analysis 0542	4029 - Water Quality
Instructions for Collecting Data on the LLENS System	1-P-QM-PRO-9015533	DOD - SOP-WQ-014	4029 - Water Quality
Low-Level Hexavalent Chromium (colorimetric) by 3500-Cr B-2009	1-P-QM-WI -9013132	Analysis 1446	4029 - Water Quality
Maintenance of Desiccators	1-P-QM-PRO-9015424	DOD - MC-WQ-012	4029 - Water Quality
Maintenance of Hot Plates	1-P-QM-PRO-9015430	DOD - MC-WQ-024	4029 - Water Quality
Methylene-Blue-Active Substances (MBAS) by 5540 C-2000 or EPA 425.1	1-P-QM-WI -9011638	Analysis 0225	4029 - Water Quality
Moisture (Gravimetric), Total Residue (#0521), Volatile Residue (#0522), Total Fixed Residue/Ash (#1029) by SM 2540 G-1997 or SM 2540 E-1997 in Solids	1-P-QM-WI -9014030	Analysis 6866, 0521, 0522, 1029	4029 - Water Quality
n-Hexane Extractable Material (HEM) in Solids and Silica Gel Treated n-Hexane Extractable Material (SGT-HEM)	1-P-QM-WI -9013456	Analysis 2562, 6598	4029 - Water Quality
Orion 960 Autotitration System	1-P-QM-PRO-9015428	DOD - MC-WQ-022	4029 - Water Quality
Orthophosphate by EPA 365.3, or 4500-P E-1999	1-P-QM-WI -9011639	Analysis 0226	4029 - Water Quality
Oxidation-Reduction Potential	1-P-QM-WI -9013403	Analysis 1821	4029 - Water Quality
Paint Filter Liquids Test (Free Liquids Test)	1-P-QM-WI -9013402	Analysis 1820	4029 - Water Quality
Particle Size Distribution of Soils and Solids/Grain Size Classification by ASTM D422-63 (reapproved 2007)	1-P-QM-WI -9014165	Analysis 7103, 11601, 11604	4029 - Water Quality
Percent Solids for GC/MS by EPA 1666	1-P-QM-WI -9013444	Analysis 2365	4029 - Water Quality
pH (SW) (Electrometric)	1-P-QM-WI -9011685	Analysis 0394, 0496	4029 - Water Quality
pH Probes and Meters	1-P-QM-PRO-9015421	DOD - MC-WQ-007	4029 - Water Quality
Quality Control Data for Wet Chemistry	1-P-QM-PRO-9015535	DOD - SOP-WQ-017	4029 - Water Quality
Reactive Sulfide	1-P-QM-WI -9013032	Analysis 1122	4029 - Water Quality
Reactivity of Waste	1-P-QM-WI -9013027	Analysis 1121	4029 - Water Quality
Settleable Solids by 2540 F-1997, or EPA 160.5	1-P-QM-WI -9011631	Analysis 0215	4029 - Water Quality

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Soluble Biochemical Oxygen Demand Determination in Waters by Incubation by 5210 B Modified-2001 or EPA 405.1	1-P-QM-WI -9012740	Analysis 0541	4029 - Water Quality
Specific Conductance (Solids) by SW-846 9050 (Modified), EPA 120.1 (Modified) or 2510B-1997	1-P-QM-WI -9013113	Analysis 1215	4029 - Water Quality
Spectronic Genesys 2 and Genesys 10 Vis Spectrophotometers	1-P-QM-PRO-9015417	DOD - MC-WQ-002	4029 - Water Quality
Standardization of 0.02 and 0.1 Normal Sulfuric Acid	1-P-QM-PRO-9015530	DOD - SOP-WQ-002	4029 - Water Quality
Standardization of 0.02 Normal Sodium Hydroxide	1-P-QM-PRO-9015531	DOD - SOP-WQ-005	4029 - Water Quality
Sulfate (turbidimetric) by EPA 375.4 in Waters	1-P-QM-WI -9013037	Analysis 1125	4029 - Water Quality
Sulfide Titration for Water by 4500 S2 F-2000, EPA 376.1, or SW-846 Method 9034	1-P-QM-WI -9013125	Analysis 1333	4029 - Water Quality
Sulfite by 4500-SO3 B-2000, or EPA 377.1	1-P-QM-WI -9011641	Analysis 0229	4029 - Water Quality
Total Dissolved Solids (Calculation)	1-P-QM-WI -9011627	Analysis 0209	4029 - Water Quality
Total Dissolved Solids by 2540 C	1-P-QM-WI -9014026	Analysis 6649	4029 - Water Quality
Total Dissolved Solids in Waters (Gravimetric) by 2540 C-1997 or EPA 160.1	1-P-QM-WI -9011630	Analysis 0212	4029 - Water Quality
Total Fixed Solids Total Volatile Solids by 2540 E-1997, 160.4 or 2540 G-1997	1-P-QM-WI -9011624	Analysis 0204, 0205	4029 - Water Quality
Total Solids by 2540 B-1997, EPA 160.3 or 2540 G-1997	1-P-QM-WI -9011623	Analysis 0203	4029 - Water Quality
Total Suspended Solids in Waters (Gravimetric) by SM 2540 D - 1997	1-P-QM-WI -9012778	Analysis 10457	4029 - Water Quality
Volatile Dissolved Solids (Calculation)	1-P-QM-WI -9011629	Analysis 0211	4029 - Water Quality
Water Quality Washroom Procedures	1-P-QM-PRO-9015532	DOD - SOP-WQ-006	4029 - Water Quality
YSI Model 5100 Dissolved Oxygen Meter	1-P-QM-PRO-9015429	DOD - MC-WQ-023	4029 - Water Quality
Analysis of Air for Selected Volatile Organic Compounds by Gas Chromatography with Flame Ionization Detector and Photo Using EPA Method 18 and 25	1-P-QM-WI -9015177	Analysis DOD - 7090	4030 - Volatiles in Air
Calibration of Pressure Gauges	1-P-QM-PRO-9015391	DOD - MC-AL-002	4030 - Volatiles in Air
Cleaning and Handling of Flow Controllers	1-P-QM-PRO-9015432	DOD - SOP-AL-002	4030 - Volatiles in Air
Cleaning and Handling of Summa Canisters	1-P-QM-PRO-9015431	DOD - SOP-AL-001	4030 - Volatiles in Air
Helium as a Tracer Gas	1-P-QM-WI -9012770	Analysis 10341	4030 - Volatiles in Air
Oxygen and Carbon Dioxide in Air	1-P-QM-WI -9011592	Analysis 0034	4030 - Volatiles in Air
Preparing Summa Can Order	1-P-QM-PRO-9017690	SOP-AL-005	4030 - Volatiles in Air
Procedure for Compositing Samples from a Tedlar Bag	1-P-QM-PRO-9017689	SOP-AL-004	4030 - Volatiles in Air
Routine Instrument Maintenance for Volatiles in Air by GC and GC/MS	1-P-QM-PRO-9015392	DOD - MC-AL-003	4030 - Volatiles in Air
SIM Analysis of Low-Level Volatile Organic Compounds in Air Collected in Specially Treated Canisters or Tedlar Bags Using Cryogenic Preconcentration and Gas Chromatography with SIM Mass Selective Detection Using EPA Method TO-15	1-P-QM-WI -9015182	Analysis DOD - 7345	4030 - Volatiles in Air
The Determination of Volatile Organic Compounds in Air Collected in Summa Canisters or Tedlar Bags Using Cryogenic Preconcentration and GC/MS Detection Using EPA Method TO-14 or TO-15	1-P-QM-WI -9015155	Analysis DOD - 5265, 5298, 0015, 0037, 7199, 7869	4030 - Volatiles in Air

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Volatiles in Air Audit Process	1-P-QM-PRO-9015433	DOD - SOP-AL-003	4030 - Volatiles in Air
Volatiles in Air Tentatively Identified Compound Method	1-P-QM-WI -9014034	Analysis 6900	4030 - Volatiles in Air
Volatiles in Air Tentatively Identified Compound Method (Interpretive)	1-P-QM-WI -9012747	Analysis 0888	4030 - Volatiles in Air
Calibration, Operation and Maintenance of pH Probes and Meters	1-P-QM-PRO-9017426	MC-FS-002	4031 - Field Sampling
Collecting Potable Water Samples	1-P-QM-PRO-9017759	SOP-FS-004	4031 - Field Sampling
Collecting Water Samples for Regulatory Purposes	1-P-QM-PRO-9015458	DOD - SOP-FS-012	4031 - Field Sampling
Direct Field Readings Using Orion Model 1230 Multi-Parameter Meter	1-P-QM-PRO-9017761	SOP-FS-008	4031 - Field Sampling
Groundwater Monitoring Sampling Procedure	1-P-QM-PRO-9017760	SOP-FS-006	4031 - Field Sampling
Low Level Mercury Sampling	1-P-QM-PRO-9017763	SOP-FS-010	4031 - Field Sampling
Performing Free Chlorine Residual Readings	1-P-QM-PRO-9017764	SOP-FS-011	4031 - Field Sampling
Sampling Swimming Pool Water	1-P-QM-PRO-9018291	SOP-TR-003	4031 - Field Sampling
Soil Sampling Procedures	1-P-QM-PRO-9017758	SOP-FS-003	4031 - Field Sampling
Symphony Multi-Parameter Meter	1-P-QM-PRO-9017762	SOP-FS-009	4031 - Field Sampling
Wastewater Field Sampling Procedures	1-P-QM-PRO-9017757	SOP-FS-002	4031 - Field Sampling
1,6-hexanediamine in by 8015B Modified in Waters and Solids	1-P-QM-WI -9028763	Analysis 8919, 8920	4032 - EPH/Misc. GC
10g Silica Gel Cleanup for Hydrocarbons by GC in Soil and Water Matrices	1-P-QM-WI -9013055	Analysis 11681	4032 - EPH/Misc. GC
3 g Silica Gel Column Cleanup for DRO	1-P-QM-WI -9021425	Analysis 12932	4032 - EPH/Misc. GC
Alumina Column Cleanup by Method 3610B for Solid Samples	1-P-QM-WI -9013040	Analysis 11599, 11600	4032 - EPH/Misc. GC
Analysis of DRO/RRO by Alaska 102/103 in Waters and Soils	1-P-QM-WI -9013394	Analysis 1738, 1741, 1742, 2238, 2244, 2245, 2923	4032 - EPH/Misc. GC
Carbon Dioxide in Water Using Headspace Sampling Techniques and GC-TCD, Method RSK-175 or 8015	1-P-QM-WI -9015187	Analysis DOD - 8097, 13139	4032 - EPH/Misc. GC
CCWE Water Miscible Solvents	1-P-QM-WI -9012748	Analysis 0969	4032 - EPH/Misc. GC
Common Equations Used During Chromatographic Analyses	1-P-QM-PRO-9015448	DOD - SOP-EP-008	4032 - EPH/Misc. GC
Determination of Diesel and Residual Range Organics using Alaska 102/103 Small Volume (SV) Protocols in Aqueous Samples	1-P-QM-WI -9021778	Analysis 13025, 13028, 13222, 13930	4032 - EPH/Misc. GC
Determination of Petroleum Range Organics in Waters and Solids using FL-PRO	1-P-QM-WI -9013420	Analysis 0347, 0359, 2099, 2100	4032 - EPH/Misc. GC
DRO by 8015B and TPH by NWTPH-DX (Modified) in Water using Mini-Extraction and GC-FID	1-P-QM-WI -9021423	Analysis 12899, 12908, 12917	4032 - EPH/Misc. GC
DRO in Waters or Solids by Wisconsin DRO Method using GC-FID	1-P-QM-WI -9014172	Analysis 7553, 7554	4032 - EPH/Misc. GC
DRO/TPH by Method 8015 (B, C, or D) in Waters using Microextraction and GC-FID	1-P-QM-WI -9020899	Analysis 12858, 12879, 13163, 13165	4032 - EPH/Misc. GC
EPH by Massachusetts Protocol (MAEPH) in Waters and Solids Using GC	1-P-QM-WI -9013971	Analysis 5331, 5332, 5944, 5949, 5968, 5969, 10892, 10897	4032 - EPH/Misc. GC
EPH in Waters and Solids Using GC-FID by Method ECY97-602 WA EPH	1-P-QM-WI -9013990	Analysis 5979, 5970	4032 - EPH/Misc. GC

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Extractable Petroleum Hydrocarbons by Method OA-2 (Iowa/Missouri Protocol) in Waters and Solids using GC/FID	1-P-QM-WI -9013421	Analysis 2110, 2112	4032 - EPH/Misc. GC
Extraction of Soils/Solids for Glycol Analysis	1-P-QM-WI -9013039	Analysis 11551, 13121	4032 - EPH/Misc. GC
Extraction of Solids/Soils for Analysis of Alcohols by Method 8015B	1-P-QM-WI -9011684	Analysis 0380	4032 - EPH/Misc. GC
Extraction Procedure for the Determination of Diesel Range Organics in a Water or Wastewater Matrix by Oklahoma Methodology	1-P-QM-WI -9013016	Analysis 11168	4032 - EPH/Misc. GC
Extraction Procedure for the Determination of Total Petroleum Hydrocarbon Organics in a Water or Wastewater Matrix by Texas Methodology	1-P-QM-WI -9013023	Analysis 11192	4032 - EPH/Misc. GC
Extraction Procedure for the Determination of Total Petroleum Hydrocarbons in a Water or Wastewater Matrix by Connecticut Methodology	1-P-QM-WI -9013020	Analysis 11178	4032 - EPH/Misc. GC
Extraction Procedure for the Determination ofTotal Petroleum Hydrocarbons in a Soil or Solid Matrix by Texas Methodology	1-P-QM-WI -9013033	Analysis 11230, 11244	4032 - EPH/Misc. GC
Extraction Procedure for Wisconsin DRO Soils and Solid Waste	1-P-QM-WI -9012868	Analysis 11029	4032 - EPH/Misc. GC
Fractionated EPH using LA RECAP Ranges in Waters and Solids by GC-FID	1-P-QM-WI -9015030	Analysis 8323, 8324, 6976, 7062	4032 - EPH/Misc. GC
GC Routine and Nonroutine Maintenance for Instrumentation Used for VPH Analysis	1-P-QM-PRO-9023979	N/A	4032 - EPH/Misc. GC
Glycols by Method 8015B/8015C in Solids using GC-FID	1-P-QM-WI -9015029	Analysis 8283, 12925, 12934	4032 - EPH/Misc. GC
Glycols in Waters by Method 8015B or 8015C Using GC-FID	1-P-QM-WI -9015028	Analysis 8278, 11099, 12926	4032 - EPH/Misc. GC
Interpretation and Integration of Chromatographic Data	1-P-QM-PRO-9015451	DOD - SOP-EP-011	4032 - EPH/Misc. GC
MA DEP VPH in Waters and Solids Using GC	1-P-QM-WI -9015061	Analysis 8754, 8765, 5869, 5988, 6629, 6630, 10886, 10889	4032 - EPH/Misc. GC
Maintenance and Troubleshooting Procedures for GC-FID Instrumentation	1-P-QM-PRO-9015447	DOD - SOP-EP-006	4032 - EPH/Misc. GC
Microextraction by Method 3511 for the Determination of Diesel Range Organics in Water	1-P-QM-WI -9013110	Analysis 12059, 12897, 13175, 13177	4032 - EPH/Misc. GC
Microwave Extraction Method 3546 for DRO and Saturated Hydrocarbons in a Solid Matrix	1-P-QM-WI -9015120	Analysis DOD - 10942, 11509, 11210	4032 - EPH/Misc. GC
Microwave Extraction Method 3546 for NJ EPH in a Solid Matrix	1-P-QM-WI -9012864	Analysis 10979, 11990	4032 - EPH/Misc. GC
Microwave Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Solid Matrix by Montana Protocol	1-P-QM-WI -9013028	Analysis 11212	4032 - EPH/Misc. GC
Microwave Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Solid Matrix by Washington Protocol	1-P-QM-WI -9013029	Analysis 11213	4032 - EPH/Misc. GC
Microwave Extraction, Method 3546, for MA EPH in a Solid Matrix	1-P-QM-WI -9013429	Analysis 2168, 11235	4032 - EPH/Misc. GC
Monitoring QC Data Acceptance Limits	1-P-QM-PRO-9015450	DOD - SOP-EP-010	4032 - EPH/Misc. GC
New Jersey Extractable Petroleum Hydrocarbons (NJEPH) in Waters and Solids using GC-FID	1-P-QM-WI -9012863	Analysis 10967, 10973, 11986, 12997	4032 - EPH/Misc. GC

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PMI VOCs (Direct Injection) by Method 1671A in Waters Using GC/FID	1-P-QM-WI -9013445	Analysis 2366, 2380	4032 - EPH/Misc. GC
QC Data Acceptability and Corrective Action	1-P-QM-PRO-9015449	DOD - SOP-EP-009	4032 - EPH/Misc. GC
Qualitative/Quantitative GC Fingerprint by 8015B Mod/ 8015C Mod/ or 8015D Mod	1-P-QM-WI -9013412	Analysis 2012, 2535	4032 - EPH/Misc. GC
Quick Silica Gel Cleanup for Hydrocarbons by GC in Solid and Water Matrices	1-P-QM-WI -9013430	Analysis 2176	4032 - EPH/Misc. GC
Separatory Funnel Extract Procedure for the Determination of Extractable Petroleum Hydrocarbons (EPH) in a Water or Wastewater Matrix by Tennessee Methodology	1-P-QM-WI -9013021	Analysis 11179	4032 - EPH/Misc. GC
Separatory Funnel Extraction by Method 3510C for DRO in Water by California Methodology	1-P-QM-WI -9013446	Analysis 2376, 11169, 11180, 11187, 11188, 11198, 11199, 12820, 13156	4032 - EPH/Misc. GC
Separatory Funnel Extraction for DRO and RRO by AK 102/103 in a Water Matrix	1-P-QM-WI -9013022	Analysis 11184, 11185, 11242, 13027, 13030	4032 - EPH/Misc. GC
Separatory Funnel Extraction Method 3510C for DRO in Water or Wastewater	1-P-QM-WI -9015175	Analysis DOD - 7003, 10304, 11164, 11167, 11171, 11172, 11176, 11177, 11181, 11183, 11189, 11190, 11191, 11195, 11196, 11201, 11203, 11596, 12820, 12906, 12915, 12923, 13095, 13212	4032 - EPH/Misc. GC
Separatory Funnel Extraction Method ECY 97-602 NWTPH-DX for TPH in a Water or Wastewater Matrix	1-P-QM-WI -9013424	Analysis 2135, 11197, 12007, 12119, 12120, 12907, 12916, 12924	4032 - EPH/Misc. GC
Separatory Funnel Extraction Procedure for the Determination of Diesel Range Organics in a Water or Wastewater Matrix by Maine Methodology	1-P-QM-WI -9013014	Analysis 11165	4032 - EPH/Misc. GC
Separatory Funnel Extraction Procedure for the Determination of Diesel Range Organics in a Water or Wastewater Matrix by Wisconsin Protocol	1-P-QM-WI -9013015	Analysis 11166	4032 - EPH/Misc. GC
Separatory Funnel Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Water Matrix by Washington Methodology	1-P-QM-WI -9013019	Analysis 11175	4032 - EPH/Misc. GC
Separatory Funnel Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Water or Wastewater Matrix by Massachusetts or New Jersey Protocol	1-P-QM-WI -9014170	Analysis 7326, 10980, 11200 MA/LA/NJ	4032 - EPH/Misc. GC
Separatory Funnel Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Water or Wastewater Matrix by Montana Protocol	1-P-QM-WI -9013018	Analysis 11174, 11243	4032 - EPH/Misc. GC
Separatory Funnel Extraction Procedure for the Determination of Total Petroleum Hydrocarbon Organics in a Water or Wastewater Matrix by FL-PRO	1-P-QM-WI -9013017	Analysis 11170	4032 - EPH/Misc. GC
Silica Gel Column Cleanup (Method 3630C Mod) for Hydrocarbons by GC in Aqueous Matrices	1-P-QM-WI -9020897	Analysis 12894	4032 - EPH/Misc. GC
Silica Gel Fractionation for Hydrocarbons by GC in Soil and Water Matrices	1-P-QM-WI -9012711	Analysis 0497	4032 - EPH/Misc. GC

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Sonic Disruption Extraction Procedure for the Determination of GC Fingerprint on Petroleum Products in Soil or Solid Matrix	1-P-QM-WI -9015151	Analysis DOD - 4833, 11227	4032 - EPH/Misc. GC
Sonic Probe Extraction by FL-PRO for Petroleum Range Organics in Solids	1-P-QM-WI -9013026	Analysis 11208	4032 - EPH/Misc. GC
Sonic Probe Extraction for the Determination of Extractable Total Petroleum Hydrocarbons in Soil or Solid Matrix Connecticut Methology	1-P-QM-WI -9013030	Analysis 11216	4032 - EPH/Misc. GC
Sonic Probe Extraction for TPH in Solids by Washington DX	1-P-QM-WI -9014041	Analysis 7024, 11234, 12008, 12117, 12118	4032 - EPH/Misc. GC
Sonic Probe Extraction of Glycols by Method 3550C from a Solid Matrix	1-P-QM-WI -9032542	Analysis 12933	4032 - EPH/Misc. GC
Sonic Probe Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in Soil or Solid Matrix Tennessee Methodology	1-P-QM-WI -9013031	Analysis 11217	4032 - EPH/Misc. GC
Sonication Extraction Method 3550C for DRO in Soils or Solids	1-P-QM-WI -9015176	Analysis DOD - 7004, 10303, 11204, 11205, 11209, 11215, 11218, 11219, 11225, 11228, 11229, 11233, 11236, 11237, 11238, 13097	4032 - EPH/Misc. GC
Sonication Extraction Procedure for the Determination of Diesel Organics in Soil or Solid Matrix by Alaska Methodology	1-P-QM-WI -9015123	Analysis DOD - 11222, 11223, 11239, 11248	4032 - EPH/Misc. GC
Sonication Extraction Procedure for the Determination of Diesel Organics in Soil or Solid Matrix Oklahoma Methodology	1-P-QM-WI -9013024	Analysis 11206	4032 - EPH/Misc. GC
Sonication Extraction Procedure for the Determination of Diesel Range Organics in Soil or Solid Matrix California Methodology	1-P-QM-WI -9013025	Analysis 11207, 11214	4032 - EPH/Misc. GC
Terphenyls by Method 8015B in Water and Solids Using GC-FID	1-P-QM-WI -9012769	Analysis 10318, 10319	4032 - EPH/Misc. GC
TNRCC TX Method 1005 - Total Petroleum Hydrocarbons (Gasoline Range, Diesel Range, and Extended Range Organics) in Waters and Solids	1-P-QM-WI -9013442	Analysis 2318, 2321	4032 - EPH/Misc. GC
Total Extractable Hydrocarbons (TEH) by Method 8015B Modified Using GC-FID	1-P-QM-WI -9013137	Analysis 1464, 1469, 10007	4032 - EPH/Misc. GC
Total Petroleum Hydrocarbons with Ranges by Methods 8015B/8015C/8015D in Waters and Solids by GC-FID	1-P-QM-WI -9015186	Analysis DOD - 8093, 8107, 2500, 2516, 2729, 2740, 0071, 0072, 6631, 6635, 10199, 10365, 12952	4032 - EPH/Misc. GC
Total Saturated Hydrocarbons by Method 8015C in Waters and Solids using GC/FID	1-P-QM-WI -9013038	Analysis 11507, 11554	4032 - EPH/Misc. GC
TPH by CT ETPH	1-P-QM-WI -9013462	Analysis 2768, 2769	4032 - EPH/Misc. GC
TPH by Methods 8015B/C/D mod. in Waters and Solids Using GC-FID	1-P-QM-WI -9015154	Analysis DOD - 5256, 5260, 8734, 8735, 13137, 13138	4032 - EPH/Misc. GC
TPH by NWTPH-Dx (modified) in Soils using GC-FID	1-P-QM-WI -9015027	Analysis 8272, 2214, 12006	4032 - EPH/Misc. GC
TPH by NWTPH-Dx (modified) in Waters using GC-FID	1-P-QM-WI -9015026	Analysis 8271, 2211, 12005	4032 - EPH/Misc. GC
TPH by TN EPH in Water and Soil using GC-FID	1-P-QM-WI -9013463	Analysis 2784, 2785	4032 - EPH/Misc. GC
TPH DRO (Diesel Range Organics) by Oklahoma DEQ Method	1-P-QM-WI -9014308	Analysis 7784, 7785, 10024, 10027	4032 - EPH/Misc. GC

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TPH-DRO by 8015B in Water using GC-FID (Diesel Range Organics)	1-P-QM-WI -9020088	1070, 2216, 5867, 6609, 6610, 6884, 6885, 6912, 6913, 8269, 8349, 11918, 12680, 12816, 11346	4032 - EPH/Misc. GC
TPH-DRO by 8015B/8015C/8015D in Solids using GC-FID (Diesel Range Organics)	1-P-QM-WI -9015191	Analysis DOD - 1104, 2222, 5868, 6901, 6902, 8270, 8345, 10941, 12831, 13567	4032 - EPH/Misc. GC
TPH-DRO by 8015C South Carolina Methodology Using GC-FID	1-P-QM-WI -9024963	Analysis 13094, 13096	4032 - EPH/Misc. GC
TPH-DRO by 8015C/8015D in Water using GC-FID (Diesel Range Organics)	1-P-QM-WI -9015111	Analysis DOD - 10600, 13256	4032 - EPH/Misc. GC
TPH-DRO by Methods 8015C or 8015D in Solids using GC-FID	1-P-QM-WI -9015112	Analysis DOD - 10601, 12838	4032 - EPH/Misc. GC
TPH-DX with Fuel Identification in Waters and Solids by NWTPH-DX	1-P-QM-WI -9023949	Analysis 12071, 12082, 12093, 12094	4032 - EPH/Misc. GC
TX 1006 Characterization of C6-C35 Petroleum Hydrocarbons in Waters and Soilds	1-P-QM-WI -9013996	Analysis 6091, 6104	4032 - EPH/Misc. GC
Using "Range Compound Analysis" Software for Range Data Acquisition	1-P-QM-PRO-9017817	SOP-OR-082	4032 - EPH/Misc. GC
Volatile Hydrocarbons in Water by Method RSK-175 Modified and SW-846 8015 Using Headspace Sampling Techniques and GC-FID	1-P-QM-WI -9015178	Analysis DOD - 7105, 10602, 13693	4032 - EPH/Misc. GC
Volatile Organic Concentration of Waste Samples by Method 25D Using FID and ELCD	1-P-QM-WI -9014040	Analysis 7001	4032 - EPH/Misc. GC
VPH in Waters and Solids Using GC-FID by Method ECY 97-602 WA VPH	1-P-QM-WI -9013982	Analysis 5665, 5666	4032 - EPH/Misc. GC
Waste Dilution for the Determination of Saturated Hydrocarbons in an Oil Matrix	1-P-QM-WI -9013051	Analysis 11657	4032 - EPH/Misc. GC
Water Miscible Solvents by Method 8015B/8015C/8015D Using GC-FID	1-P-QM-WI -9015169	Analysis DOD - 6624, 10501, 10603, 10604	4032 - EPH/Misc. GC
Analysis of Nicotine in Tobacco by GC/FID Following Coresta 62	1-P-QM-WI -9014032	Analysis 6878	4035 - Nitrosamines
Analysis of Nicotine in Tobacco by GC/FID for Smokeless Tobacco Products Using the CDC Method	1-P-QM-WI -9011595	Analysis 0097	4035 - Nitrosamines
Analysis of Tobacco Specific Nitrosamines (TSNA) in Tobacco Leaf by LC/MS/MS	1-P-QM-WI -9013802	Analysis 5102	4035 - Nitrosamines
CDC Tobacco Moisture	1-P-QM-WI -9011594	Analysis 0091	4035 - Nitrosamines
Column Cleanup of Tobacco for TSNAs	1-P-QM-WI -9014036	Analysis 6962	4035 - Nitrosamines
Extraction of Nicotine from Tobacco and Tobacco Products	1-P-QM-WI -9014031	Analysis 6870	4035 - Nitrosamines
Extraction of Nicotine from Tobacco Products Using the Centers for Disease Control Protocol	1-P-QM-WI -9011593	Analysis 0088	4035 - Nitrosamines
Extraction of Tobacco for Benzo[a]Pyrene	1-P-QM-WI -9014033	Analysis 6883	4035 - Nitrosamines
Extraction of Tobacco Specific N-Nitrosamines in Tobacco Filler	1-P-QM-WI -9013443	Analysis 2326LC	4035 - Nitrosamines
Nitrate in Tobacco Prep	1-P-QM-WI -9013457	Analysis 2610	4035 - Nitrosamines
Nitrate Nitrogen in Tobacco (Colorimetric, Automated Cadmium Reduction)	1-P-QM-WI -9013464	Analysis 2808	4035 - Nitrosamines
Nitrite in Tobacco Prep	1-P-QM-WI -9013438	Analysis 2264	4035 - Nitrosamines
Nitrite Nitrogen Analysis in Tobacco	1-P-QM-WI -9013440	Analysis 2266	4035 - Nitrosamines
Tobacco Drying and Grinding	1-P-QM-WI -9013801	Analysis 4998	4035 - Nitrosamines

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10g Silica Gel Cleanup for Hydrocarbons by GC in Soil and Water Matrices	1-P-QM-WI -9013055	Analysis 11681	4036 - Organic Extraction
3 g Silica Gel Column Cleanup for DRO	1-P-QM-WI -9021425	Analysis 12932	4036 - Organic Extraction
Alumina Column Cleanup by Method 3610B for Solid Samples	1-P-QM-WI -9013040	Analysis 11599, 11600	4036 - Organic Extraction
Cleanup Procedures for the Extraction of Pesticides and Polychlorinated Biphenyls (PCBs)	1-P-QM-PRO-9015477	DOD - SOP-OE-004	4036 - Organic Extraction
Concentration Using a TurboVap LV Concentration Workstation	1-P-QM-PRO-9015489	DOD - SOP-OE-016	4036 - Organic Extraction
Determination of Percentage Fat Using Accelerated Solvent Extraction (ASE)	1-P-QM-WI -9015144	Analysis DOD - 4193ASE	4036 - Organic Extraction
Determining QC Sample Volume for Organic Extractions	1-P-QM-PRO-9015480	DOD - SOP-OE-007	4036 - Organic Extraction
Electrothermal Heating Mantles	1-P-QM-PRO-9015410	DOD - MC-OE-009	4036 - Organic Extraction
Extraction By Method 8318/8318A for Carbamate and Urea Pesticides in Solids	1-P-QM-WI -9013140	Analysis 1510, 11143	4036 - Organic Extraction
Extraction for Perchlorate by Method 6850 in Solids	1-P-QM-WI -9015167	Analysis DOD - 6568	4036 - Organic Extraction
Extraction of Chlorinated Acids and Herbicides in Drinking Water by Method 515.1	1-P-QM-WI -9014002	Analysis 6369	4036 - Organic Extraction
Extraction of Chlorinated Herbicides in a Soil Matrix	1-P-QM-WI -9013472	Analysis 4181	4036 - Organic Extraction
Extraction of Chlorinated Herbicides in a Water Matrix by SW-846 8151A	1-P-QM-WI -9015078	Analysis DOD - 0816, 11110, 11111	4036 - Organic Extraction
Extraction of Formaldehyde and Other Aldehydes in a Water by Method 8315A	1-P-QM-WI -9015090	Analysis DOD - 1013, 11124, 12857	4036 - Organic Extraction
Extraction of Nitroaromatics and Nitroamines by Method 8330/A/B in Water	1-P-QM-WI -9015171	Analysis DOD - 6915, 11122, 11125, 13432	4036 - Organic Extraction
Extraction of Semi-Volatile Organic Compounds by Method 525.2 in Drinking Waters	1-P-QM-WI -9015152	Analysis DOD - 4894	4036 - Organic Extraction
Extraction Procedure for the Determination of 2-Chlrorbenzalmalonotrile (CS) and 3-Quinuclidinyl Benzilate (BZ) in Water and Wastewater	1-P-QM-WI -9012779	Analysis 10475	4036 - Organic Extraction
Extraction Procedure for the Determination of Diesel Range Organics in a Water or Wastewater Matrix by Oklahoma Methodology	1-P-QM-WI -9013016	Analysis 11168	4036 - Organic Extraction
Extraction Procedure for the Determination of Formaldehyde and Aldehydes in a Solid Matrix	1-P-QM-WI -9015162	Analysis DOD - 5876, 11139	4036 - Organic Extraction
Extraction Procedure for the Determination of PAHs in an XAD Air Tube Sample by TO-15A	1-P-QM-WI -9014491	Analysis 7806AIR	4036 - Organic Extraction
Extraction Procedure for the Determination of Total Petroleum Hydrocarbon Organics in a Water or Wastewater Matrix by Texas Methodology	1-P-QM-WI -9013023	Analysis 11192	4036 - Organic Extraction
Extraction Procedure for the Determination of Total Petroleum Hydrocarbons in a Water or Wastewater Matrix by Connecticut Methodology	1-P-QM-WI -9013020	Analysis 11178	4036 - Organic Extraction
Extraction Procedure for the Determination ofTotal Petroleum Hydrocarbons in a Soil or Solid Matrix by Texas Methodology	1-P-QM-WI -9013033	Analysis 11230, 11244	4036 - Organic Extraction
Extraction Procedure for Wisconsin DRO Soils and Solid Waste	1-P-QM-WI -9012868	Analysis 11029	4036 - Organic Extraction
Glassware Cleaning for Organic Extractions	1-P-QM-PRO-9015475	DOD - SOP-OE-001	4036 - Organic Extraction
Glassware Cleaning using Automatic Washers for non-Organic Extraction Glassware	1-P-QM-PRO-9015487	DOD - SOP-OE-014	4036 - Organic Extraction

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Liquid/Liquid Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables in a Wastewater Matrix by Method 8270	1-P-QM-WI -9015098	Analysis DOD - 10458	4036 - Organic Extraction
Liquid/Liquid Extraction Procedure for the Determination of Neutral Extractables in a Wastewater Matrix	1-P-QM-WI -9013043	Analysis 11629	4036 - Organic Extraction
Liquid/Liquid Extraction Procedure for the Determination of Organophosphorous Pesticides in a Wastewater Matrix	1-P-QM-WI -9012765	Analysis 10240	4036 - Organic Extraction
Liquid-Liquid Extraction Procedure for the Determination of Target Compound List Analytes in a Water Matrix	1-P-QM-WI -9015147	Analysis DOD - 4606	4036 - Organic Extraction
Low-Level Sonic Probe Extraction Procedure by Method 3550C for the Determination of Semivolatiles in a Solid Matrix	1-P-QM-WI -9015070	Analysis DOD - 0381, 10478, 10480, 10483, 10486, 10487L	4036 - Organic Extraction
Low-Level Sonic Probe Extraction Procedure for the Determination of Target Compound List Analytes in a Solid Matrix	1-P-QM-WI -9015148	Analysis DOD - 4607	4036 - Organic Extraction
Low-Level Sonication Extraction Procedure for the Determination of Polynuclear Aromatic Hydrocarbons (PAHs) in a Solid Matrix by GC/MS	1-P-QM-WI -9014490	Analysis 7806	4036 - Organic Extraction
Maintenance and Calibration of the Microwave Accelerated Reaction System	1-P-QM-PRO-9017428	MC-OE-013	4036 - Organic Extraction
Maintenance of Accelerated Solvent Extractor (ASE) and the Pressurized Solvent Extractor (PSE)	1-P-QM-PRO-9015486	DOD - SOP-OE-013	4036 - Organic Extraction
Medium Level Sonic Probe Extraction Procedure for the Determination of Pesticides and PCBs in a Solid Matrix	1-P-QM-WI -9012745	Analysis 0819M, 11144	4036 - Organic Extraction
Microextraction by Method 3511 for the Determination of Diesel Range Organics in Water	1-P-QM-WI -9013110	Analysis 12059, 12897, 13175, 13177	4036 - Organic Extraction
Microextraction by Method 504.1 or 8011 for EDB, DBCP, and TCP in Water	1-P-QM-WI -9014309	Analysis 7786, 13715	4036 - Organic Extraction
Microextraction of EDB, DBCP, and TCP in Solids by Method 8011	1-P-QM-WI -9025371	Analysis 13218	4036 - Organic Extraction
Microwave Extraction by Method 3546 for Semivolatiles	1-P-QM-WI -9015105	Analysis DOD - 10498, 10809, 10810, 10811, 10812, 10813, 10814, 11630, 11916	4036 - Organic Extraction
Microwave Extraction for the Determination of Semivolatiles in a Solid Matrix	1-P-QM-WI -9012780	Analysis 10481, 11598	4036 - Organic Extraction
Microwave Extraction Method 3546 for DRO and Saturated Hydrocarbons in a Solid Matrix	1-P-QM-WI -9015120	Analysis DOD - 10942, 11509, 11210	4036 - Organic Extraction
Microwave Extraction Method 3546 for NJ EPH in a Solid Matrix	1-P-QM-WI -9012864	Analysis 10979, 11990	4036 - Organic Extraction
Microwave Extraction Method 3546 for PCBs in a Solid Matrix	1-P-QM-WI -9015104	Analysis DOD - 10497, 11140, 13100	4036 - Organic Extraction
Microwave Extraction Method 3546 for Pesticides in a Solid Matrix	1-P-QM-WI -9015103	Analysis DOD - 10496, 11141	4036 - Organic Extraction
Microwave Extraction of Pesticides and PCBs in Non-aqueous Samples by SW-846 Method 3546 for OH VAP	1-P-QM-WI -9022433	Analysis 10496, 10497 OH VAP	4036 - Organic Extraction
Microwave Extraction of Semivolatiles in Non-Aqueous Samples by SW-846 Method 3546 for OH VAP	1-P-QM-WI -9022475	Analysis 10813 OH VAP	4036 - Organic Extraction

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Microwave Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Solid Matrix by Montana Protocol	1-P-QM-WI -9013028	Analysis 11212	4036 - Organic Extraction
Microwave Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Solid Matrix by Washington Protocol	1-P-QM-WI -9013029	Analysis 11213	4036 - Organic Extraction
Microwave Extraction, Method 3546, for MA EPH in a Solid Matrix	1-P-QM-WI -9013429	Analysis 2168, 11235	4036 - Organic Extraction
Multipette Stream Operation and Calibration	1-P-QM-PRO-9029413	N/A	4036 - Organic Extraction
N-Evap	1-P-QM-PRO-9015411	DOD - MC-OE-010	4036 - Organic Extraction
Organic Extraction Standards Storage and Handling	1-P-QM-PRO-9015490	DOD - SOP-OE-017	4036 - Organic Extraction
Passive In-Situ Chemical Extraction Sampler (PISCES) Procedure for the Determination of Polychlorinated Biphenyls (PCBs)	1-P-QM-WI -9013121	Analysis 12801	4036 - Organic Extraction
Pesticide Extract Cleanup Using Gel Permeation Chromatography	1-P-QM-PRO-9015407	DOD - MC-OE-004	4036 - Organic Extraction
Pesticide Extract Cleanup Using Gel Permeation Chromatography for OH VAP	1-P-QM-PRO-9023663	N/A	4036 - Organic Extraction
Pesticide Extract Concentration Using a Zymark TurboVap II Concentration Workstation	1-P-QM-PRO-9015485	DOD - SOP-OE-012	4036 - Organic Extraction
Pesticides and Polychlorinated Biphenyls (PCBs) Cleanup Procedures for OH VAP	1-P-QM-PRO-9024148	N/A	4036 - Organic Extraction
pH Meters and Electrodes	1-P-QM-PRO-9015478	DOD - SOP-OE-005	4036 - Organic Extraction
Pore Water Generation Procedure	1-P-QM-WI -9015106	Analysis DOD - 10500	4036 - Organic Extraction
Procedure for Containment and Clean Up of Hazardous Materials Spills in Organic Prep Lab	1-P-QM-PRO-9015479	DOD - SOP-OE-006	4036 - Organic Extraction
Quick Silica Gel Cleanup for Hydrocarbons by GC in Solid and Water Matrices	1-P-QM-WI -9013430	Analysis 2176	4036 - Organic Extraction
Refrigerated Recirculators	1-P-QM-PRO-9015409	DOD - MC-OE-008	4036 - Organic Extraction
Routine Maintenance of Miele Glass Washers	1-P-QM-PRO-9015484	DOD - SOP-OE-011	4036 - Organic Extraction
Sampling Equipment Cleaning and Validation for Metals Analysis	1-P-QM-WI -9015089	Analysis DOD - 10068	4036 - Organic Extraction
Scheduling Extraction Batches	1-P-QM-PRO-9015481	DOD - SOP-OE-008	4036 - Organic Extraction
Semivolatile Extract Cleanup Using Gel Permeation Chromatography	1-P-QM-PRO-9015406	DOD - MC-OE-003	4036 - Organic Extraction
Semivolatile Extract Cleanup Using Gel Permeation Chromatography for OH VAP	1-P-QM-PRO-9023664	N/A	4036 - Organic Extraction
Semivolatile Extract Concentration Using a Zymark TurboVap II Concentration Workstation	1-P-QM-PRO-9015488	DOD - SOP-OE-015	4036 - Organic Extraction
Separatory Funnel Extract Procedure for the Determination of Extractable Petroleum Hydrocarbons (EPH) in a Water or Wastewater Matrix by Tennessee Methodology	1-P-QM-WI -9013021	Analysis 11179	4036 - Organic Extraction
Separatory Funnel Extraction (Method 3510C) or Waste Dilution (Method 3580A) of Base Neutrals and Acid Extractables in Leachates	1-P-QM-WI -9015149	Analysis DOD - 4731	4036 - Organic Extraction
Separatory Funnel Extraction by Method 3510C for BNAs in Wastewater	1-P-QM-WI -9015076	Analysis DOD - 0813, 11010, 11015, 10464, 10467, 10476	4036 - Organic Extraction
Separatory Funnel Extraction by Method 3510C for DRO in Water by California Methodology	1-P-QM-WI -9013446	Analysis 2376, 11169, 11180, 11187, 11188, 11198, 11199, 12820, 13156	4036 - Organic Extraction

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Separatory Funnel Extraction by Method 3510C for Tetraethyl Lead in Waters	1-P-QM-WI -9015101	Analysis DOD - 10472	4036 - Organic Extraction
Separatory Funnel Extraction by Method 3510C, 608 or 622 for Pesticides and PCBs in a Wastewater	1-P-QM-WI -9015079	Analysis DOD - 6654, 10241, 11112, 11113, 11114, 11116, 11117, 11118, 11119, 11120, 11121, 11123, 11126, 11960, 12026, 12822, 13086, 13093, 13183, 13187	4036 - Organic Extraction
Separatory Funnel Extraction for DRO and RRO by AK 102/103 in a Water Matrix	1-P-QM-WI -9013022	Analysis 11184, 11185, 11242, 13027, 13030	4036 - Organic Extraction
Separatory Funnel Extraction for the Determination of PAHs in Water by GC/MS Using Method 3510C	1-P-QM-WI -9015185	Analysis DOD - 7807	4036 - Organic Extraction
Separatory Funnel Extraction Method 3510C for DRO in Water or Wastewater	1-P-QM-WI -9015175	Analysis DOD - 7003, 10304, 11164, 11167, 11171, 11172, 11176, 11177, 11181, 11183, 11189, 11190, 11191, 11195, 11196, 11201, 11203, 11596, 12820, 12906, 12915, 12923, 13095, 13212	4036 - Organic Extraction
Separatory Funnel Extraction Method ECY 97-602 NWTPH-DX for TPH in a Water or Wastewater Matrix	1-P-QM-WI -9013424	Analysis 2135, 11197, 12007, 12119, 12120, 12907, 12916, 12924	4036 - Organic Extraction
Separatory Funnel Extraction of Pesticides and PCBs in Aqueous Samples by SW-846 Method 3510C for OH VAP	1-P-QM-WI -9022427	Analysis 11117, 11118 OH VAP	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables by SIM in a Wastewater Matrix	1-P-QM-WI -9015121	Analysis DOD - 11012, 10465, 10466, 10470, 10471, 11912	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Base-Neutrals and Acid Extractables in a Wastewater Matrix by Method 625	1-P-QM-WI -9015188	Analysis DOD - 8108, 10463	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Chlorinated Pesticides; Nitrogen and Phosphorus Containing Pesticides; and PCBs in a Drinking Water Matrix	1-P-QM-WI -9014001	Analysis 6368, 11127	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Diesel Range Organics in a Water or Wastewater Matrix by Maine Methodology	1-P-QM-WI -9013014	Analysis 11165	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Diesel Range Organics in a Water or Wastewater Matrix by Wisconsin Protocol	1-P-QM-WI -9013015	Analysis 11166	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Water Matrix by Washington Methodology	1-P-QM-WI -9013019	Analysis 11175	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Water or Wastewater Matrix by Massachusetts or New Jersey Protocol	1-P-QM-WI -9014170	Analysis 7326, 10980, 11200 MA/LA/NJ	4036 - Organic Extraction

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Separatory Funnel Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in a Water or Wastewater Matrix by Montana Protocol	1-P-QM-WI -9013018	Analysis 11174, 11243	4036 - Organic Extraction
Separatory Funnel Extraction Procedure for the Determination of Total Petroleum Hydrocarbon Organics in a Water or Wastewater Matrix by FL-PRO	1-P-QM-WI -9013017	Analysis 11170	4036 - Organic Extraction
Separatory Funnel Extraction Semivolatile Organic Compounds in an Aqueous Samples by SW-846 Method 3510C for OH VAP	1-P-QM-WI -9022472	Analysis 10464 OH VAP	4036 - Organic Extraction
Silica Gel Column Cleanup (Method 3630C Mod) for Hydrocarbons by GC in Aqueous Matrices	1-P-QM-WI -9020897	Analysis 12894	4036 - Organic Extraction
Silica Gel Fractionation for Hydrocarbons by GC in Soil and Water Matrices	1-P-QM-WI -9012711	Analysis 0497	4036 - Organic Extraction
Solid Phase Extraction Procedure for the Determination of THPA, THPI and PA in a Water Matrix	1-P-QM-WI -9012865	Analysis 11011	4036 - Organic Extraction
Solvent and Reagent Lot Testing for Organic Extractions	1-P-QM-PRO-9015476	DOD - SOP-OE-002	4036 - Organic Extraction
Sonic Disruption Extraction Procedure for the Determination of GC Fingerprint on Petroleum Products in Soil or Solid Matrix	1-P-QM-WI -9015151	Analysis DOD - 4833, 11227	4036 - Organic Extraction
Sonic Probe Extraction by FL-PRO for Petroleum Range Organics in Solids	1-P-QM-WI -9013026	Analysis 11208	4036 - Organic Extraction
Sonic Probe Extraction for the Determination of Extractable Total Petroleum Hydrocarbons in Soil or Solid Matrix Connecticut Methology	1-P-QM-WI -9013030	Analysis 11216	4036 - Organic Extraction
Sonic Probe Extraction for the Determination of Pesticides in a Solid Matrix	1-P-QM-WI -9015163	Analysis DOD - 11129, 11131, 11134	4036 - Organic Extraction
Sonic Probe Extraction for TPH in Solids by Washington DX	1-P-QM-WI -9014041	Analysis 7024, 11234, 12008, 12117, 12118	4036 - Organic Extraction
Sonic Probe Extraction of Glycols by Method 3550C from a Solid Matrix	1-P-QM-WI -9032542	Analysis 12933	4036 - Organic Extraction
Sonic Probe Extraction of Pesticides and PCBs in Solid Samples by SW-846 Method 3550C for OH VAP	1-P-QM-WI -9022432	Analysis 0819, 11134 OH VAP	4036 - Organic Extraction
Sonic Probe Extraction Procedure for the Determination of Extractable Petroleum Hydrocarbons in Soil or Solid Matrix Tennessee Methodology	1-P-QM-WI -9013031	Analysis 11217	4036 - Organic Extraction
Sonic Probe Extraction Procedure for the Determination of Polychlorinated Biphenyls (PCBs) in a Solid Matrix	1-P-QM-WI -9015081	Analysis DOD - 0819, 11128, 11132, 11135	4036 - Organic Extraction
Sonic Probe Extraction Procedure for the Determination of Semivolatiles in a Complex Matrix	1-P-QM-WI -9015189	Analysis DOD - 8108TJ	4036 - Organic Extraction
Sonic Probe Extraction Procedure for the Determination of Semivolatiles in a Solid Matrix by SIM	1-P-QM-WI -9015102	Analysis DOD - 10479, 10484, 10489, 11914	4036 - Organic Extraction
Sonic Probe Extraction Procedure for the Determination of Semivolatiles in Non-Aqueous Samples by SW-846 Method 3550C for OH VAP	1-P-QM-WI -9022476	Analysis 0381 10478 OH VAP	4036 - Organic Extraction

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Sonication Extraction Method 3550C for DRO in Soils or Solids	1-P-QM-WI -9015176	Analysis DOD - 7004, 10303, 11204, 11205, 11209, 11215, 11218, 11219, 11225, 11228, 11229, 11233, 11236, 11237, 11238, 13097	4036 - Organic Extraction
Sonication Extraction of Nitroaromatics and Nitroamines by Method 8330/A/B in Soilds	1-P-QM-WI -9015173	Analysis DOD - 6917, 11137, 11138, 13433	4036 - Organic Extraction
Sonication Extraction Procedure for the Determination of Diesel Organics in Soil or Solid Matrix by Alaska Methodology	1-P-QM-WI -9015123	Analysis DOD - 11222, 11223, 11239, 11248	4036 - Organic Extraction
Sonication Extraction Procedure for the Determination of Diesel Organics in Soil or Solid Matrix Oklahoma Methodology	1-P-QM-WI -9013024	Analysis 11206	4036 - Organic Extraction
Sonication Extraction Procedure for the Determination of Diesel Range Organics in Soil or Solid Matrix California Methodology	1-P-QM-WI -9013025	Analysis 11207, 11214	4036 - Organic Extraction
Soxhlet Extraction (Method 3540C) for Triazine Herbicides and Organophosphorous Pesticides in a Solid Matrix	1-P-QM-WI -9015170	Analysis DOD - 6677, 11130, 11133, 11142, 13181, 13185	4036 - Organic Extraction
Soxhlet Extraction Procedure for Extractable Matter in Textiles	1-P-QM-WI -9015134	Analysis DOD - 1948, 1949, 1950, 1951, 1952	4036 - Organic Extraction
Spike Solution Testing and Approval	1-P-QM-PRO-9015482	DOD - SOP-OE-009	4036 - Organic Extraction
Steam Bath and N-Evap Usage, Calibration and Maintenance	1-P-QM-PRO-9015408	DOD - MC-OE-007	4036 - Organic Extraction
Ultrasonic Probe Horn Cleaning	1-P-QM-PRO-9015483	DOD - SOP-OE-010	4036 - Organic Extraction
Ultrasonic Processor Maintenance and Tuning	1-P-QM-PRO-9015405	DOD - MC-OE-002	4036 - Organic Extraction
Waste Dilution for the Determination of Saturated Hydrocarbons in an Oil Matrix	1-P-QM-WI -9013051	Analysis 11657	4036 - Organic Extraction
Waste Dilution Procedure for the Determination of Acid Extractables and Base-Neutrals in a Non-Water Soluble Leachate Matrix	1-P-QM-WI -9015150	Analysis DOD - 4731DIL	4036 - Organic Extraction
Waste Dilution Procedure for the Determination of Acid Extractables and Base-Neutrals in a Non-Water Soluble Matrix	1-P-QM-WI -9015071	Analysis DOD - 0381DIL	4036 - Organic Extraction
Waste Dilution Procedure for the Determination of PCBs in Oil	1-P-QM-WI -9015077	Analysis DOD - 0815	4036 - Organic Extraction
Waste Dilution Procedure for the Determination of Pesticides and PCBs in a Non-Water Soluble Leachate Matrix	1-P-QM-WI -9015080	Analysis DOD - 11114DIL	4036 - Organic Extraction
Analysis of Fluorotelomer Alcohols in Water, Wastewater, Soil and Sludges	1-P-QM-WI -9035224	Analysis 13969, 13977	4037 - Specialty Services Group
Determination of Dioxin-like Polychlorinated Biophenyls by HRGC/HRMS in Aqueous and Solid Matrices	1-P-QM-WI -9013071	Analysis 11773, 12416, 12942	4037 - Specialty Services Group
Determination of Diuron, Fenuron and Monuron in Soil Samples by LC/MS/MS	1-P-QM-WI -9013054	Analysis 11663	4037 - Specialty Services Group
Determination of Diuron, Fenuron and Monuron in Water Samples by SPE Extraction and LC/MS/MS	1-P-QM-WI -9013044	Analysis 11639	4037 - Specialty Services Group
Determination of Endothall in Soil Samples by LCMSMS	1-P-QM-WI -9015125	Analysis DOD - 11688	4037 - Specialty Services Group
Determination of Glycols in Waters by Direct Injection LC/MS/MS Method	1-P-QM-WI -9013111	Analysis 12060	4037 - Specialty Services Group
Determination of Hydrazine in Mainstream Smoke via Liquid Chromatography/Tandem Mass Spectrometry	1-P-QM-WI -9020139	NA	4037 - Specialty Services Group

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Determination of Hydrazine, Monomethylhydrazine and 1,1-Dimethylhydrazinein Soil Samples by LC/MS/MS	1-P-QM-WI -9015096	Analysis DOD - 10346	4037 - Specialty Services Group
Determination of Hydrazine, Monomethylhydrazine and 1.1-Dimethylhydrazine in Aqueous Samples by LC/MS/MS Using SW-846 8315A Modified	1-P-QM-WI -9015095	Analysis DOD - 10342	4037 - Specialty Services Group
Determination of Multiple Client Specific APIs in Surface Water by LCMSMS	1-P-QM-WI -9023568	N/A	4037 - Specialty Services Group
Determination of PCB Homologs in Waters and Solids by Method 680	1-P-QM-WI -9034081	Analysis 13716, 13729	4037 - Specialty Services Group
Determination of Percentage Lipids in Animal and Marine Tissue	1-P-QM-WI -9032128	Analysis 13448	4037 - Specialty Services Group
Determination of Perchlorate in Milk and Milk Powder by LCMSMS	1-P-QM-WI -9013074	Analysis 11962, 11964	4037 - Specialty Services Group
Determination of Perfluorinated Compounds (PFCs) in Solids by Method 537 Modified Using LC/MS/MS	1-P-QM-WI -9035864	Analysis 14027	4037 - Specialty Services Group
Determination of Perfluorooctanoic Acid (PFOA) in Aqueous Samples by LC/MS/MS	1-P-QM-WI -9012866	Analysis 11016	4037 - Specialty Services Group
Determination of Selected Perfluorinated Alkyl Acids (PFAAs) in Aqueous Samples by LC/MS/MS by Method 537	1-P-QM-WI -9012802	Analysis 10954	4037 - Specialty Services Group
Determination of Tetra- Through Octa-Chlorinated Dioxins and Furans using HRGC/HRMS by EPA 1613B or SW-846 8290A	1-P-QM-WI -9015119	Analysis DOD - 10915, 11031, 11645, 11650, 12935, 12936, 12937, 13232, 13233	4037 - Specialty Services Group
DFS HRGC/HRMS Preventative and Corrective Maintenance	1-P-QM-PRO-9015412	DOD - MC-SP-001	4037 - Specialty Services Group
Extraction of Vegetation utilizing the QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) Technique for Pesticides	1-P-QM-WI -9013073	Analysis 11911	4037 - Specialty Services Group
Extraction of Water and Soil Samples by Method 680	1-P-QM-WI -9034059	Analysis 13730, 13731	4037 - Specialty Services Group
Extraction of Waters for Fluorotelomer Alcohols	1-P-QM-WI -9035209	Analysis 13976, 13978	4037 - Specialty Services Group
Glassware Cleaning for HRMS Extractions	1-P-QM-PRO-9025452	N/A	4037 - Specialty Services Group
Maintenance and Tuning for Thermo Scientific TSQ Quantum Access Tandem Mass Spectrometer with a Thermo Electron Accela HPLC System (LC/MS/MS)	1-P-QM-PRO-9018268	SOP-SP-001	4037 - Specialty Services Group
ORGANOTINS by KRONE et al. (1989) via GC/MS and Selected Ion Monitoring (SIM)	1-P-QM-WI -9028808	N/A	4037 - Specialty Services Group
PCB Congeners by Method 1668 HRGC/HRMS in Aqueous and Solid Matricies	1-P-QM-WI -9013114	Analysis 12154, 12429	4037 - Specialty Services Group
Processing High Resolution Mass Spectrometry Data Using TargetQuan	1-P-QM-PRO-9018269	SOP-SP-004	4037 - Specialty Services Group
Sample Extract Column Cleanup Procedure for HRMS Analysis	1-P-QM-PRO-9015510	DOD - SOP-SP-003	4037 - Specialty Services Group
Separatory Funnel Sample Extraction Procedure for HRMS Analysis in a Water Matrix	1-P-QM-WI -9015118	Analysis DOD - 10914	4037 - Specialty Services Group
Soxhlet Sample Extraction Procedure for HRMS Analysis in a Solid Matrix	1-P-QM-WI -9015122	Analysis DOD - 11030	4037 - Specialty Services Group
Standards Management in the High Resolution Mass Spectrometry Laboratory	1-P-QM-PRO-9018270	SOP-SP-005	4037 - Specialty Services Group

Document Title	Document ID	Historical Document ID	Document Owner
Level 3 – Environmental Sciences (continued)			
The Determination of Pesticides by Gas Chromatography/Tandem Mass Spectrometry (GC/MS/MS)	1-P-QM-WI -9013072	Analysis 11788	4037 - Specialty Services Group
Thermo Scientific Trace Ultra Gas Chromatograph Quantum XLS Tandem Mass Spectrometer (GC/MS/MS) Preventative and Corrective Maintenance	1-P-QM-PRO-9017429	MC-SP-002	4037 - Specialty Services Group
Archiving Department 4025 Raw Sample Data and Other Miscellaneous Data	1-P-QM-PRO-9015445	DOD - SOP-DP-022	4038 - Data Deliverables
Assembly and Review of Environmental Data Packages	1-P-QM-PRO-9017748	SOP-DP-037	4038 - Data Deliverables
Generation and Content Review of GLP Compliant Data Packages	1-P-QM-PRO-9017747	SOP-DP-034	4038 - Data Deliverables
Overchecking the Electronic Data Deliverable	1-P-QM-PRO-9015442	DOD - SOP-DP-009	4038 - Data Deliverables
Preparation of Data Packages on CD ROM	1-P-QM-PRO-9015444	DOD - SOP-DP-014	4038 - Data Deliverables
Processing and Sending Data Packages	1-P-QM-PRO-9015441	DOD - SOP-DP-007	4038 - Data Deliverables
Auditing Client Paperwork	1-P-QM-PRO-9015436	DOD - SOP-CL-007	4039 – Environmental Client Services
Client Concern and ISPD Code Entry	1-P-QM-PRO-9015439	DOD - SOP-CL-015	4039 – Environmental Client Services
Client/Prospects Visits	1-P-QM-PRO-9017799	SOP-MK-104	4039 – Environmental Client Services
Creating Bottle Orders	1-P-QM-PRO-9017701	SOP-CL-016	4039 – Environmental Client Services
Creating Project Information Lists	1-P-QM-PRO-9017702	SOP-CL-017	4039 – Environmental Client Services
Daily or Weekly DEP Reporting	1-P-QM-PRO-9017699	SOP-CL-012	4039 – Environmental Client Services
Monthly DEP Reporting	1-P-QM-PRO-9017700	SOP-CL-013	4039 – Environmental Client Services
Phone Log and Email Documentation	1-P-QM-PRO-9015435	DOD - SOP-CL-006	4039 – Environmental Client Services
Preparing Quotations	1-P-QM-PRO-9017698	SOP-CL-008	4039 – Environmental Client Services
Proposal Preparation	1-P-QM-PRO-9017800	SOP-MK-105	4039 – Environmental Client Services
Sample Set-Up Form Creation Guide	1-P-QM-PRO-9015438	DOD - SOP-CL-014	4039 – Environmental Client Services
Scheduling and Pricing of Rush Samples	1-P-QM-PRO-9015437	DOD - SOP-CL-010	4039 – Environmental Client Services
Tracking and Communicating Rush Results	1-P-QM-PRO-9015434	DOD - SOP-CL-005	4039 – Environmental Client Services
ELLE QA Reports to Management	1-P-QM-PRO-9020717	N/A	4052 - Environmental Quality Assurance
Environmental Quality Assurance Functions for GLP Compliance	1-P-QM-PRO-9018256	SOP-QC-032	4052 - Environmental Quality Assurance
Environmental Quality Assurance Review of Client Project and Bid Documents	1-P-QM-PRO-9022599	N/A	4052 - Environmental Quality Assurance
ETM System Probe Calibration	1-P-QM-PRO-9015418	DOD - MC-WQ-003	4052 - Environmental Quality Assurance
Hosting of Environmental Client and Agency Audits	1-P-QM-PRO-9022134	N/A	4052 - Environmental Quality Assurance
Maintenance of Environmental Certifications and Accreditations	1-P-QM-PRO-9018261	SOP-QC-039	4052 - Environmental Quality Assurance
Performing Electronic Data Audits using Mint Miner Software	1-P-QM-PRO-9018259	SOP-QC-036	4052 - Environmental Quality Assurance

Document Title	Document ID	Historical Document ID	Document Owner
Level 3 – Environmental Sciences (continued)			
Performing Environmental Quality Assurance Audits	1-P-QM-PRO-9020535	N/A	4052 - Environmental Quality Assurance
Proficiency Test and Double Blind Samples	1-P-QM-PRO-9018237	SOP-QC-003	4052 - Environmental Quality Assurance
QA Approval of Environmental Analytical Procedures and Standard Operating Procedures	1-P-QM-PRO-9022099	N/A	4052 - Environmental Quality Assurance
QA Processing for Bottle Lot and Preservative Checks	1-P-QM-PRO-9035857	N/A	4052 - Environmental Quality Assurance
Quality Assurance Review of End-of-Month QC Reports	1-P-QM-PRO-9018253	SOP-QC-028	4052 - Environmental Quality Assurance
Sample Pick-Up, Transportation, and Delivery	1-P-QM-PRO-9018293	SOP-TR-018	6041 - Transportation
Transportation Summary SOP	1-P-QM-PRO-9028514	N/A	6041 - Transportation
What to Do in Case of Vehicular Accident or Breakdown	1-P-QM-PRO-9018292	SOP-TR-010	6041 - Transportation
Assigning Sample Delivery Group Numbers and Five-Digit Sample Codes to Sample Groups	1-P-QM-PRO-9015506	DOD - SOP-SA-119	6042 - Environmental Sample Administration
Entry of Environmental Samples Requiring Subcontracting	1-P-QM-PRO-9015507	DOD - SOP-SA-129	6042 - Environmental Sample Administration
Environmental Sample Entry	1-P-QM-PRO-9015502	DOD - SOP-SA-101	6042 - Environmental Sample Administration
Environmental Sample Receipt and Unpacking	1-P-QM-PRO-9015504	DOD - SOP-SA-103	6042 - Environmental Sample Administration
Filing of Sample Information	1-P-QM-PRO-9015505	DOD - SOP-SA-107	6042 - Environmental Sample Administration
Sample Receipt at Sample Receipt Desk	1-P-QM-PRO-9015503	DOD - SOP-SA-102	6042 - Environmental Sample Administration
Taking the Temperature of Environmental Samples Upon Arrival at the Lab	1-P-QM-PRO-9015508	DOD - SOP-SA-138	6042 - Environmental Sample Administration
ASRS Emergency Failure Procedure	1-P-QM-PRO-9015523	DOD - SOP-SS-024	6055 - Sample Support
Automated Storage and Retrieval System (ASRS) Lockout/Tagout Procedure	1-P-QM-PRO-9015518	DOD - SOP-SS-019	6055 - Sample Support
Automated Storage, Retrieval, and Discarding of Samples	1-P-QM-PRO-9015512	DOD - SOP-SS-006	6055 - Sample Support
Bulk Solid Sample Preparation by SW-846 5035A for OH VAP	1-P-QM-WI -9012777	Analysis 11967 OH VAP	6055 - Sample Support
GC/MS - Bulk Solid Matrix Sample Preparation	1-P-QM-WI -9015069	Analysis DOD - 0374, 6646, 10445, 11966, 11967	6055 - Sample Support
Glassware Cleaning	1-P-QM-PRO-9018271	SOP-SS-026	6055 - Sample Support
Hardware Procedures for ASRS	1-P-QM-PRO-9015515	DOD - SOP-SS-015	6055 - Sample Support
Homogenization, Sample Splitting, and Subsampling of Solid Waste Samples from Environmental Sources	1-P-QM-PRO-9015513	DOD - SOP-SS-009	6055 - Sample Support
Instructions for Collecting Data on the LLENS System	1-P-QM-PRO-9015520	DOD - SOP-SS-021	6055 - Sample Support
Liquid Sample Preservation	1-P-QM-PRO-9015511	DOD - SOP-SS-002	6055 - Sample Support
Maintenance of Desiccators	1-P-QM-PRO-9015414	DOD - MC-SS-002	6055 - Sample Support
Moisture (Gravimetric)	1-P-QM-WI -9015065	Analysis DOD - 0111, 6111, 7611, 11624, 12845	6055 - Sample Support
Non-Automated Storage, Retrieval, and Discarding of Samples	1-P-QM-PRO-9015521	DOD - SOP-SS-022	6055 - Sample Support
Outlier Quality Control Data	1-P-QM-PRO-9015519	DOD - SOP-SS-020	6055 - Sample Support
Percent Solids by SM 2540G-1997	1-P-QM-WI -9015183	Analysis DOD - 7400	6055 - Sample Support

Document Title	Document ID	Historical Document ID	Document Owner
Level 3 – Environmental Sciences (continued)			
Pipette Dispenser Calibration Procedure	1-P-QM-PRO-9015517	DOD - SOP-SS-018	6055 - Sample Support
Preparation of Soil and Solid Samples for GC Volatile Analyses	1-P-QM-WI -9015124	Analysis DOD - 1150, 6170, 11968, 11969	6055 - Sample Support
Preparation of Soils for Volatile Analysis by EPA SW-846 Method 5035	1-P-QM-WI -9015193	Analysis DOD - 8389, 8390, 6130, 6117, 6174, 7578, 7320	6055 - Sample Support
Preparation of Solid Samples by SW-846 Method 5035A (Field Preserved and EnCores) for OH VAP	1-P-QM-WI -9022845	Analysis 2392, 6171, 6176, 7320, 7578, 7579, 8389, 8390 OH VAP	6055 - Sample Support
Preparation of Vials for Field Preservation of Soils for Volatile Analysis	1-P-QM-WI -9015073	Analysis DOD - 0388, 6119, 6169, 6647, 0405, 1169, 6171, 6172, 6173, 6645, 2392, 6176, 7579, 0069, 11014, 11764	6055 - Sample Support
Prescreening Water and Soil Samples for Volatile Organic Compounds	1-P-QM-PRO-9015522	DOD - SOP-SS-023	6055 - Sample Support
Preservation and Bottles Room Preservative Traceability	1-P-QM-PRO-9015516	DOD - SOP-SS-017	6055 - Sample Support
Sample Preparation of Solid Samples for Extraction and Analysis by SW-846 8330B	1-P-QM-PRO-9030806	N/A	6055 - Sample Support
Sample Support Ovens	1-P-QM-PRO-9015413	DOD - MC-SS-001	6055 - Sample Support
Subsampling for Subcontracted Analyses	1-P-QM-PRO-9015514	DOD - SOP-SS-010	6055 - Sample Support
Tobacco Moisture	1-P-QM-WI -9015168	Analysis DOD - 6611	6055 - Sample Support
Water Content (Moisture) by ASTM D 2216	1-P-QM-WI -9014166	Analysis 7116, 7119	6055 - Sample Support
Bottle Preparation	1-P-QM-PRO-9018263	SOP-SB-003	6059 - Sample Bottles
Packing Bottle Orders	1-P-QM-PRO-9018264	SOP-SB-008	6059 - Sample Bottles
Preparation of Acid Dilutions	1-P-QM-PRO-9018267	SOP-SB-017	6059 - Sample Bottles
Preparation of Trip Blanks	1-P-QM-PRO-9018265	SOP-SB-012	6059 - Sample Bottles
Processing Bottle Orders	1-P-QM-PRO-9018266	SOP-SB-016	6059 - Sample Bottles

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Prepared by	Christiane Sweigart
Reviewed and Approved by	Duane Luckenbill;Review;Sunday, December 13, 2015 10:36:34 PM EST Dorothy Love;Approval;Thursday, December 17, 2015 3:56:52 PM EST

Instrument	# of Units	Manufacturer/Model #
Liquid Chromatography/Gas Chromatography/Mass Spectrometry (LC/GC/MS)		
LC/MS/MS	1	AB Sciex 4000 with Agilent 1100 Series LC
LC/MS/MS	1	Agilent 1200 LC with Agilent 6410 MS/MS
LC/MS/MS	1	Agilent 1290 LC with Micromass Quattro micro MS/MS and Waters 2996 Photodiode Array UV-Vis Detector
LC/MS/MS	1	Thermo Scientific TSQ Quantum Access with Acella LC
LC/MS/MS	2	Waters 2795 LC with Micromass Quattro micro MS/MS
GC/MS	2	Agilent 5972
GC/MS	20	Agilent 5973
GC/MS	10	Agilent 5975
GC/MS	3	Agilent 5977A
GC/MS	2	Shimadzu
GC/MS	1	Thermo Scientific ISQ
GC/MS	1	DSQ II MS with Trace GC Ultra GC
GC/MS/MS	1	Thermo TSQ 8000 MSMS with Trace 1310 GC
GC/MS/MS	1	Thermo TSQ Quantum XLS MSMS with Trace GC Ultra GC
HRGC/HRMS	4	Thermo Scientific DFS
Gas Chromatograph	13	Agilent 5890
Gas Chromatograph	40	Agilent 6890
Gas Chromatograph	2	Shimadzu
Gas Chromatograph	26	Agilent 7890
Gas Chromatograph	1	Varian 3400
Auxiliary Equipment for Gas Chromatographs		
Most of the GC/MS and GC systems include autosamplers and approximately half are fitted with purge and trap concentrators for analysis of volatiles.		
Purge/Trap Concentrators	30	OI 4560/4660
Autosamplers	13	Archon 5100/5100A
Autosamplers	20	Agilent 7673
Autosamplers	21	Agilent 7683
Autosamplers	28	Agilent 7693
Autosamplers	6	OI 4551/4552
Autosamplers	5	EST Centruion
Autosamplers	7	Thermo Scientific AS TriPlus
Autosamplers	3	CTC Combipal Headspace
Automated Sampling System (Tedlar Bags)	1	Tekmar 2016/2032/LSC2000
Automated Sampling System (Summa Canisters)	3	Entech 7016CR Autosamplers
Automated Sampling System (Tedlar Bags/Summa Canisters)	1	Entech 7032A
Automated Sampling System (Tedlar Bags/Summa Canisters)	1	Markes CIA-A HL Satellite Autosampler
Automated Concentrator	3	Entech 7100
Automated Concentrator	1	Markes Unity 2/CIA-A HL
Automated Summa Canister Cleaning System	1	Wasson/TO-Clean
Detectors available for GC: Electron Capture, Flame Ionization, Photoionization, Hall Electrolytic Conductivity, Nitrogen/Phosphorus, and Thermal Conductivity. All of the chromatographs are connected to electronic integration systems.		

High Performance Liquid Chromatography		
High Performance Liquid Chromatograph	2	Agilent 1100 LC
High Performance Liquid Chromatograph	2	Agilent 1200 HPLC
High Performance Liquid Chromatograph	1	Waters alliance 2695
High Performance Liquid Chromatograph	1	Waters alliance 2795
Gel Permeation Chromatography		
Gel Permeation Chromatograph	3	J2Scientific AccuPrep
Ion Chromatography		
Ion Chromatograph	1	Metrohm 881 IC Pro
Ion Chromatograph	1	Dionex ICS1000
Ion Chromatograph	1	Dionex ICS3000
Ion Chromatograph	1	Dionex ICS2000
Ion Chromatograph	4	Dionex ICS1100
Atomic Absorption/Emission Spectrophotometry		
ICAP™ 6000 Duo ICP Analyzer	4	Thermo
ICP/MS	1	P/E Sciex Elan 9000
ICP/MS	1	Agilent 7500ce
ICP/MS	1	Agilent 7700x
Mercury Analyzer	2	Leeman Labs Hydra II
Mercury Analyzer	1	Leeman Labs HYDRA AF$_{GOLD+}$
Prep Station	3	Thomas Cain DEENA 60
UV Vis/IR Spectrophotometry:		
UV-Vis Spectrophotometer	3	Spectronic Genesys
UV-Vis Spectrophotomenter	1	Hach DR2800
Miscellaneous Chemistry Instrumentation		
Auto-titrator System	2	Mantech
Block Digestion Systems	8	Environmental Express SC150
Block Digestion Systems	6	Environmental Express SC154
Centrifuge	5	Various
Chilled water recirculators		Various
Closed Cup Flashpoint Apparatus, Pensky-Martin	1	Fisher Scientific TA6
Cyanide Midi Distillation Kits	3	Various
Dissolved Oxygen Meter	1	YSI Model 59
Flow Solution Autoanalyzer	2	Alpkem
Glassware washer - automated	6	Miele – (2) PG8257 (1) G7827 (1) G7704 (2) G7883
Kjehldal Distillation Apparatus	2	Fisher
Microwave Extractors	3	CEM MarsXpress
pH meters	13	Various
Phenol Midi Distillation	2	Andrews Glass
Pressurized Solvent Extractor	2	Dionex ASE200
Puck Mill	1	ESSA/2000
Sonicators	12	Various
Total Organic Carbon Analyzer	2	O.I. Corp. 1030
Total Organic Carbon Combustion Analyzer	1	O.I. Corp. 1010
Turbidimeter	1	Hach 2100AN
Zero Headspace Extractor	74	Various Models

Microbiology Equipment		
Autoclave	2	Steris – Amsco,
Balance	5	Mettler, PB 3002
Balance	1	Mettler-Toledo, AT200
Balance	2	Mettler-Toledo, PR2002
Balance	1	Sartorius BP4100
Biological Safety Cabinet	4	NuAire NU-425-600 Type A/B 3
Biological Safety Cabinet	1	NuAire NU-435-600 Type B2 Fume Hood
Colony Counter	1	Quebec Dark Field
Incubator	1	PGC 9311-1127
Incubator	1	PS WFY20SAWI
Microscope	1	Stereoscope with Zoom, AO Model 570
Microscope	1	Zeiss
pH Meter	2	Orion Model 410A
Quanti-Tray Sealer	1	IDEXX Model 2X
Water Bath	1	Boekel Grant with Removal Heater Circulator
Water Bath	1	Thermo Electron Corp.
Water Bath	1	Precision Coliform Incubator Bath
Water Bath	1	VWR 1275PC
Water Bath	2	Thermo Scientific Model 2862
UV Light	1	Spectronics

Computer Equipment

Our laboratories make extensive use of computers for business applications, technical operations (e.g., our sample management system), and QA Program (see section on Quality Assurance). The following is a list of the major components of our computer systems.

Numerous physical and virtual servers used to support the systems

Oracle systems run on IBM UNIX servers:

- One IBM Power 740 Server running AIX UNIX with 6 - 3.3 GHz Power7 Cores CPUs, 128GB RAM.
- One IBM P5-520 Server running AIX UNIX with 4-way 1.90GHz CPUs, 24GB RAM.
- 40+ Terra Bytes of disk storage and several SAN devices including V7000, DS4100, HP2000 and Clarion CX4-40.
- Various tape backup systems
- On-line fail over databases are available for all corporate production Oracle databases.

Networks/Telecommunication:

- TCP/IP based network
- Ten Gigabit switch to accommodate company server farm
- Dual Cisco 6506E network cores

Personal Computers/Servers:

- Internet access is provided with an ASA firewall to control incoming and outgoing traffic
- ArcServe backup server
- Microsoft Exchange server
- Dell PowerEdge file and print servers
- More than 30 Network File Servers
- More than 1000 Personal Computers

Power Systems:

- 3 Phase Power Supply
- Backup generators for life safety and sample integrity preservation

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Preventive Maintenance Schedule

Instrument	Preventive Maintenance	Frequency
GC/MS GC/MS/MS	Change septum	AN* : Min. weekly
	Clean/replace injection port seal & liner	AN
	Check/clean fans	Monthly or AN
	Check/clean cool flow	Monthly or AN
	Clean source and replace parts	Bimonthly or AN
	Change oil in diffusion pump	Annually or AN
	Change oil and service rough pump	Annually
	Change column	AN
GC and GC/MS Purge and Trap Concentrators	Check gas flows and pressures	Prior to calib. or AN
	Replace adsorbent trap in concentrators	AN
	Flush purge pathways	Monthly or AN
	Clean/replace water management	AN
GC	Septum change	AN: Min. weekly
	Column/injection port maintenance	AN
	Clean detector	AN
	Leak check ECDs	Semiannually
	Change/clean PID lamp	AN
	Change/clean/Replace FID parts	AN
	Change column	AN
GC/HRMS	System bakeout	AN
	Replacing the Secondary Electron Multiplier (SEM)	AN
	Adjusting potentials on ion source	AN
	Check sensitivity and resolution on ion source	Daily
	Cleaning ion source	AN
	Replace filament on ion source	AN
	Cleaning reference inlet	AN
	Check oil level on forepumps	monthly
	Change oil on forepumps	Yearly or if oil is cloudy or discolored
	Exchange lubricant reservoir on turbopumps	Yearly or after 5000 hours of operation
	Replace injection port liner	AN
	Clip injection port end of column	AN
	Replace septum	AN
	Clean chiller water/air filters and inspect fluid level	Monthly
	Change column	AN
LC/MS/MS	Change rough pump (vacuum) oil	Annually
	Clean cones and spray chamber	As needed, before each calibration
	Clean source and ion lenses	Annually
	Check electrospray capillary	AN
	Empty waste liquid reservoir	AN
	Tune and calibrate MS	AN

Instrument	Preventive Maintenance	Frequency
HPLC	Pump lubrication	Annually
	Check pump seals	Annually
	Check-valves cleaned or rebuilt	AN
	Replace and/or adjust detector bulb	AN
	Clean detector flow cell	AN
	Replace Teflon lines	AN
	Autosampler septa replacement	AN
	In-line filter sonication/cleaning	AN
	System passivation	AN
	PCRS pump lubrication	AN
	Empty waste liquid reservoir	AN
Cold Vapor AA and Cold Vapor AF	Replace pump tubing	AN
	Lubricate pump head & autosampler	AN
	Clean optical cells and windows	AN
ICP	Replace pump winding	AN
	Lubricate autosampler	AN
	Vacuum instrument airfilters and air intakes	AN
	Clean optics and lenses	AN
	Clean Torch and injector tip	AN
	Clean nebulizer and spray chamber	AN
ICP/MS	Change interface rough pump oil	AN
	Change MS rough pump oil	AN
	Clean cones and ion lenses	AN
	Clean Torch, injector tip, nebulizer and spray chamber	AN
	Change peristaltic tubing	AN
	Vacuum instrument airfilters and air intakes	AN
	Empty waste liquid reservoir	AN
Total Organic Carbon Analyzer	Check for leaks	AN
	Inspect rotary valve	AN
	Clean gas permeation tube	AN
	Check halide scrubber	AN
	Check dessicant tube	AN
	Dust back and clean circuit boards	AN
Autoanalyzer spectrophotometer	Clean sample probe	AN
	Clean proportioning pump	AN
	Inspect pump tubing, replace if worn	AN
	Clean wash receptacles	AN

*AN = as needed. These actions may be performed more frequently as required by the instrument's operational response.

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Details on method/instrument calibration processes are provided in the individual Analytical Procedures. This appendix provides an overview for representative methodology.
Note: This appendix is not applicable to OH VAP work. See the OH VAP approved SOPs for calibration information.

Calibration Summary for SW-846 Methods

	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GC/MS Volatiles* (8260B)	After C-cal fails	6	RF for SPCCs >0.300 for chlorobenzene and 1,1,2,2-tetrachloroethane, and >0.100 for 1,1-dichloroethene, bromoform and chloromethane %RSD CCCs <30%	Every 12 hours	1	RF for SPCCs >0.300 for chlorobenzene and 1,1,2,2-tetrachloro-ethane, and >0.100 for 1,1-dichloroethene, bromoform and chloromethane %Drift for CCCs <20
GC/MS Volatiles* (8260C)	After C-cal fails	7	RF must meet minimum RF listed in SOP %RSD of <20% for all analytes (10% may fail)	Every 12 hours	1	RF must meet minimum RF listed in SOP %Drift for CCCs <20, 20% can fail if not detected in proceeding samples
GC/MS Semivolatiles (8270C)*	After C-cal fails	6	RF for SPCCs >0.050 Max %RSD for CCCs <30%	Every 12 hours	1	RF for SPCCs 0.050 %Drift for CCCs <20
GC/MS Semivolatiles (8270D)*	After C-cal fails	6	% RSD ≤ 20% for each compound, (no more than 10% of the compounds can exceed 20% RSD); alternate fit must be used for any analyte with RSD >20% (use linear fit if correlation coefficient is 0.990 or greater; if correlation coefficient is < 0.990 then quadratic fit can be used, but the coefficient of determination must be 0.990 or greater). If linear fit is used, it must pass a linear regression check (the low standard must be within 30% of its true concentration)	Every 12 hours	1	%Drift ± 20%; (no more than 20% of the compounds can exceed 20% drift, and all compounds that exceed 20% drift must be ≤ 50% drift)
GC/MS Semi-volatiles SIM	After C-cal Fails	6	% RSD for all compounds ≤20%	Every 12 hours	1	%Drift ± 20%

Calibration Summary for SW-846 Methods

	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GC VOA	After C-cal fails	At least 5	% RSD ≤20% for individual compounds. Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20% then the average RF can be used for all compounds.	Every 10 samples	1	%Drift ± 15% for individual compounds or average % drift for all compounds in the standard ± 15%
GC Pesticides (8081A)	After C-cal fails	5	20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit. Degradation for DDT, endrin 15% Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20%, then the AVG RF can be used for all compounds.	Every 20 samples or 12 hours	1	≤15% drift from initial response for quantitation C-cal - A CCV is also compliant if the average % difference is ≤15% for all compounds in the CCV standard. DDT/Endrin breakdown check 15% every 12 hours or 20 injections
GC Pesticides (8081B)	After C-cal fails	5	20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit. Degradation for DDT, endrin 15%	Every 20 samples or 12 hours ,	1	≤20% drift from initial response for quantitation DDT/Endrin breakdown check 15% every 12 hours or 20 injections
GC PCBs (8082)	After C-cal fails	5	20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit. Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20%, then the AVG RF can be used for all compounds.	Every 20 samples or 12 hours	1	≤15% drift from initial response for quantitation C-cal - A CCV is also compliant if the average % difference is ≤15% for all compounds in the CCV standard.
GC PCBs (8082A)	After C-cal fails	5	20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit.	Every 20 samples or 12 hours	1	≤20% drift from initial response for quantitation
GC Herbicides (8151A)	After C-cal fails	5	20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit. Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20%, then the AVG RF can be used for all compounds.	Every 10 samples	1	≤15% drift from initial response for quantitation C-cal - A CCV is also compliant if the average % difference is ≤15% for all compounds in the CCV standard.

Calibration Summary for SW-846 Methods

	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
Explosives by HPLC (8330)	Each new run or after C-cal fails	5	20% RSD of RFs of initial calibration to use average RF, otherwise use curve fit Alternatively, if the average of the %RSDs of all compounds in the calibration standard is ≤20%, then the AVG RF can be used for all compounds.	Every 10 samples	1	≤15% drift from initial response for quantitation C-cal - A CCV is also compliant if the average % difference is ≤15% for all compounds in the CCV standard.
Explosives by HPLC (8330A/B)	Each new run or after C-cal fails	5	20% RSD of RFs of initial calibration to use average RF, otherwise use curve fit	Every 10 samples	1	≤20% drift from initial response for quantitation
Congeners by HRGC/HRMS	After C-cal fails	6	If %RSD for native compounds <20% and for labeled compounds <35%, otherwise a calibration curve is used	Every 12 hours	1	<15% valley peak resolution for 2378-TCDD All native and labeled compounds meet method defined recovery limits RTs within ±15 secs of RT in ICAL
Dioxins by HRGC/HRMS	After C-cal fails	6	If %RSD for native compounds <20% and for labeled compounds <35%, otherwise a calibration curve is used	Every 12 hours	1	<25% valley peak resolution for 2378-TCDD All native and labeled compounds meet method defined recovery limits RTs within ±15 secs of RT in ICAL
GC TPH-GRO	After C-cal fails	At least 5	% RSD of <20% to use the average CF, otherwise use calibration curve	Every 12 hours	1	%Drift ±15%
GC TPH-DRO (8015B)	After C-cal fails	5	20% RSD of RFs of initial calibration to use average RF, otherwise use curve fit.	Every 12 hours	1	% Drift ±15%
GC TPH-DRO (8015C/D)	After C-cal fails	5	20% RSD of RFs of initial calibration to use average RF, otherwise use curve fit.	Every 12 hours	1	% Drift ±20%
ICP/MS	Each new run	1	Independent calibration verification (ICV) within ±10%	Every 10 samples	1	±10% of true value
ICP	Each new run	1	Independent calibration verification within ±10%, standards <5%RSD	Every 10 samples	1	Same as initial
CVAA	Each new run	5	Independent calibration verification within ±10% Correlation coefficient >0.995	Every 10 samples	1	±20% of true value

Calibration Summary for SW-846 Methods

	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
Autoanalyzer	Daily	6	Correlation coefficient >0.995	Every 10 samples	1	±10% of true value
TOC Analyzer	Monthly	Water – 6 Soil – 4	Corr. Coeff. > 0.995	Every 10 samples	1	±10% of true value
Balance	Daily	bracket range of use	Top-loading: ± 2% or ± 0.02g of true value of weight, whichever is greater. Analytical: ± 0.1% or ± 0.5mg of true value of weight, whichever is greater.	N/A	N/A	N/A

*All compounds with %RSD >15 must use first or second order regression fit of the six calibration points. Alternatively, if average of the %RSD of all compounds in calibration standard is ≤15%, the AVG RF can be used for all compounds.

Abbreviations
Std Conc - The number of standard concentrations used
%RSD - Percent Relative Standard Deviation CF – Calibration Factor
SPCCs - System Performance Check Compounds
CCCs - Calibration Check Compounds C-cal - Continuing Calibration
RF - Response factor
CVAA - Cold Vapor Atomic Absorption
ICP/MS - Inductively Coupled Plasma – Mass Spectrometry
ICP - Inductively Coupled Plasma spectrophotometer; ICP run also includes inter-element correction check standard (at beginning and end of run)

GC/MS Tuning Criteria

BFB Key Ions and Ion Abundance Criteria:

Mass	Method 8260B	Method 524.2
50	15% to 40% of mass 95	15% to 40% of mass 95
75	30% to 60% of mass 95	30% to 80% of mass 95
95	Base peak = 100%	Base peak = 100%
96	5% to 9% of mass 95	5% to 9% of mass 95
173	<2% of mass 174	<2% of mass 174
174	>50% of mass 95	>50% of mass 95
175	5% to 9% of mass 174	5% to 9% of mass 174
176	>95% but <101% of mass 174	>95% but <101% of mass 174
177	5% to 9% of mass 176	5% to 9% of mass 176

DFTPP Key Ions and Ion Abundance Criteria:

Mass	Method 8270D	Method 8270C	Method 525.2
51	30 % to 80 % of mass 198	30 % to 60 % of mass 198	10 % to 80 % of base peak
68	<2% of mass 69	<2% of mass 69	<2% of mass 69
69	mass 69 relative	mass 69 relative abundance	mass 69 relative abundance

	abundance		
70	<2% of mass 69	<2% of mass 69	<2% of mass 69
127	25 % to 75 % of mass 198	40% to 60 % of mass 198	10% to 80 % of base peak
197	<1% of mass 198	<1% of mass 198	<2% of mass 198
198	Base Peak = 100%	Base Peak = 100%	Base peak or >50 % of mass 442
199	5% to 9% of mass 198	5% to 9% of mass 198	5% to 9% of mass 198
275	10% to 30% of mass 198	10% to 30% of mass 198	10% to 60% of base peak
365	>0.75% of mass 198	>1% of mass 198	>1% of base peak
441	Present but < 24% mass 442	Present but < mass 443	Present but < mass 443
442	>50% of mass 198	>40% of mass 198	Base peak or >50% of mass 198
443	15% to 24% of mass 442	17% to 23% of mass 442	15% to 24% of mass 442

Calibration Summary for Drinking Water Methods						
	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GC/MS 525.2	After C-cal fails	6	The RSD for each analyte mean RF must be ≤30%. Or a linear regression calibration curve may be used.	Every 12 hours	1	%D for RF must be ≤30%. If curve used, the point must fall on curve from I-cal.
GC 504.1	Every new run	5	% RSD <20% to use Average RF, otherwise use calibration curve.	Every 10 samples or each batch if <10 samples	1	70% to 130% of expected value
GC/MS 524.2	After C-cal fails	4	% RSD <20% otherwise use calibration curve	Every 12 hours	1	%D for RF must be ≤30%. If curved used, the % recovery based on the concentration spiked must be 70% to 130% of expected value.
GC 507 515.1	Each new run, or after C-cal fails	3	≤20% RSD of RFs of Initial Calibration to use avg. RF, otherwise use curve fit. (Degradation for DDT, Endrin ≤20% initially - Method 508.)	Every 10 samples	1	≤20% drift from initial response for both quantitation and confirmation.
HPLC 531.1	Each new run, or after C-cal fails	3	≤20% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit	Every 10 samples and/or blanks	1	≤20% drift from initial response.
Mercury auto-analyzer	Each new run	5	Initial calibration verification with ±5%	Every 10 samples	1	±10% of true value
Auto-analyzer	Daily	6	Correlation coefficient >0.995	Every 10 samples	1	±10% of true value
Balance	Daily	bracket range of use	Top-loading: ± 2% or ± 0.02g of true value of weight, whichever is greater. Analytical: ± 0.1% or ± 0.5mg of true value of weight, whichever is greater.	N/A	N/A	N/A

Calibration Summary for Drinking Water Methods						
	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
ICP	Each new run	1	Initial calibration verification ±5%	Every 10 samples	1	±10% of true value
ICP-MS	Each new run	1	Independent calibration verification within ±10%	Every 10 samples	1	±15% of true value
pH meter	Daily	3	See SOP	Every 10 samples	1	Statistical limits
IC	Monthly	5	Correlation coefficient >0.995	Every 10 samples	1	±10% of true value
ISE	Every 3 months	5	Correlation coefficient >0.995	Every 10 samples	1	±10% of true value

Abbreviations

Std Conc - The number of standard concentrations used
SPCCs - System Performance Check Compounds
CCCs - Calibration Check Compounds
RF - Response Factor
%RSD - Percent Relative Standard Deviation
%D - Percent Difference
C-cal - Continuing Calibration
CVAF – Cold Vapor Atomic Fluorescence
HPLC - High Performance Liquid Chromatography
GC - Gas Chromatograph
GC/MS - Gas Chromatography/Mass Spectrometry
ICP - Inductively Coupled Plasma spectrophotometer
ICP/MS - Inductively Coupled Plasma – Mass Spectrometry
IC - Ion Chromatograph
ISE - Ion Specific Electrode

Method 507 **Laboratory Performance Check Solution (analyzed prior to system calibration)**			
Test	Analyte	Conc. µg/mL	Requirements
Sensitivity	Vernolate	0.05	Detection of analyte; S/N > 3
Chromatographic performance	Bromacil	5.0	0.80 < PGF[a] <1.20
Column performance	Prometon Atrazine	0.30 0.15	Resolution[b] > 0.7

[a]PGF - Peak Gaussian factor. Calculated using the equation:

$$PGF = \frac{1.83 \times W(1/2)}{W(1/10)}$$

Where W(1/2) is the peak width at half height and W(1/10) is the peak width at 10% peak height.

[b]Resolution between the two peaks as defined by the equation:

$$R = \frac{t}{W}$$

Where t is the difference in elution times between the two peaks and W is the average peak width, at the baseline, of the two peaks.

Method 531.1 Laboratory Performance Check Solution (analyzed prior to system calibration)			
Test	*Analyte*	Conc. µg/mL	Requirements
Sensitivity	3-Hydroxycarbofuran	2	Detection of analyte; S/N > 3
Chromatographic performance	Aldicarb Sulfoxide	100	0.90 < PGF < 1.1[a]
Column performance	Methiocarb4-Bromo-3,5-Dimethylphenyl N-Methylcarbamate (IS)	20 10	Resolution > 1.0[b]

[a]PGF - Peak Gaussian factor. Calculated using the equation:

$$PGF = \frac{1.83 \times W(1/2)}{W(1/10)}$$

Where: W(1/2) is the peak width at half height in seconds
W(1/10) is the peak width in seconds at 10% peak height.

[b]Resolution between the two peaks as defined by the equation:

$$R = \frac{t}{W}$$

Where: t is the difference in elution times between the two peaks
W is the average peak width, at the baseline, of the two peaks.

Method 515 Laboratory Performance Check Solution (analyzed prior to system calibration)			
Test	Analyte	Conc. µg/mL	Requirements
Sensitivity	Dinoseb	0.004	Detection of analyte; S/N >3
Chromatographic performance	4-Nitrophenol	1.6	0.70 < PGF[a] < 1.05
Column performance	3,5-Dichlorobenzoic acid 4-Nitrophenol	0.6 1.6	Resolution[b] >0.40

[a]PGF - Peak Gaussian factor. Calculated using the equation:

$$PGF = \frac{1.83 \times W(1/2)}{W(1/10)}$$

Where W(1/2) is the peak width at half height and W(1/10) is the peak width at tenth height.

[b]Resolution between the two peaks as defined by the equation:

$$R = \frac{t}{W}$$

Where t is the difference in elution times between the two peaks and W is the average peak width, at the baseline, of the two peaks.

Calibration Summary for EPA 100, 200, 300, 600 & 1600 Series Methods						
	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GC/MS Volatiles*	After C-cal fails	5	RSD ≤35% for all compounds*, or a linear regression may be used	Every 24 hours	1	All compounds must meet the QC acceptance criteria as stated in the method. Compounds not stated must meet a 65% -135% recovery criteria.
GC/MS Semivolatiles**	After C-cal fails	5	RSD ≤35% for all compounds**, or a linear regression may be used Tailing factors: Benzidine < 3 Pentachlorophenol < 5	Every 24 hours	1	All compounds calibrating for <20
GC Pesticides & PCBs (Method 608)	After C-cal fails	5	10% RSD of RFs of initial calibration to use avg. RF, otherwise use curve fit. Degradation for DDT, Endrin 15%	Every 10 samples	1	≤15% drift from initial response for quantitation
GC VOA Halocarbons and/or Aromatics	After C-cal fails	At least 5	%RSD of ≤10% for individual compounds to use average RFs. If %RSD >10%, a quadratic fit type is used if correlation coefficient is >0.995.	Every 12 hours, or every 10 samples	1	Method defined limits
Dioxins by HRGC/HRMS	After C-cal fails	6	If %RSD for native compounds <20% and for labeled compounds <20%, otherwise a calibration curve is used	Every 12 hours	1	<25% valley peak resolution for 2378-TCDD All native and labeled compounds meet method defined recovery limits RTs within ±15 secs of RT in ICAL
ICP/MS	Each new run	1	Independent calibration verification (ICV) within ±10%	Every 10 samples	1	±15% of true value
ICP	Each new run	1	Independent calibration verification within ±5%, standards <3%RSD	Every 10 samples	1	±10% of true value
CVAA	Each new run	5	Independent calibration verification within ±5% Correlation coefficient >0.995	Every 10 samples	1	±10% of true value

Calibration Summary for EPA 100, 200, 300, 600 & 1600 Series Methods						
	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
CVAF	Each new run	5	The RSD ≤ 15%, and the low standard recovers ±23% of the true value	After the calibration and at the end of the analytical batch	1	±23% of the true value
Auto-analyzer	Daily	6	Correlation coefficient >0.995	Every 10 samples	1	±10% of true value
TOC	Monthly	6	Corr. Coeff. > 0.995	Every 10 samples	1	±10% of true value
Balance	Daily	4	Top-loading ±0.5%, Analytical ± 0.1% for weights >0.1 g 50 mg ± 0.5%, 20 mg ± 1.0% 10 mg and 5 mg ± 2.0%	N/A	N/A	N/A

*All compounds with %RSD >35 must use first or second order regression fit of the five calibration points. The first order regression may only be used if the correlation coefficient r ≥0.990. The second order regression may only be used if the coefficient of determination $r^2 \geq 0.990$.

* * All compounds with % RSD >35 must use first order regression fit of the five calibration points. The first order regression may only be used if the correlation coefficient r ≥0.990.

Abbreviations

Std Conc - The number of standard concentrations used
SPCCs - System Performance Check Compounds
CCCs - Calibration Check Compounds
RF - Response Factor
%RSD - Percent Relative Standard Deviation
C-cal - Continuing Calibration
CVAA - Cold Vapor Atomic Absorption spectrophotometer
CVAF - Cold Vapor Fluorescence spectrophotometer
HPLC - High Performance Liquid Chromatography
ICP - Inductively Coupled Plasma spectrophotometer; ICP run also includes inter-element correction check standard (beginning and end of run)
ICP/MS - Inductively Coupled Plasma - Mass Spectrometry

Calibration Summary for EPA TO Series Methods

	Initial Calibration			Continuing Calibration Verification		
Instrument	Frequency	# Std Conc	Acceptance Criteria	Frequency	# Std Conc	Acceptance Criteria
GC/MS Volatiles TO-15	After C-cal fails	Minimum of 5	RSD ≤30% for all compounds, 2 allowed to be >30% as long as <40%.	Every 24 hours	1	All compounds ≤30 difference.
GC/MS Volatiles TO-14A	After C-cal fails	Minimum of 5	RSD ≤30% for all compounds, 2 allowed to be >30% as long as <40%.	Every 24 hours	1	All compounds ≤30 difference.

Eurofins Document Reference	1-P-QM-GDL-9015386	**Revision**	4
Effective Date	Dec 31, 2015	**Status**	Effective
Historical/Local Document Number	DOD - Environmental Quality Policy Manual Appendix I		
Local Document Level	Level 1		
Local Document Type	POL - Policy		
Local Document Category	ES - Environmental Sciences		

Prepared by	Barbara Reedy
Reviewed and Approved by	Duane Luckenbill;Review;Sunday, December 13, 2015 10:27:16 PM EST Dorothy Love;Approval;Thursday, December 17, 2015 3:58:32 PM EST

NOTE: Current certificates are maintained by the QA Department and are available on our website at http://env.lancasterlabs.com/resources/certifications

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300
PADWIS ID: 36037

Eurofins Lancaster Laboratories Environmental LLC
2425 New Holland Pike
Lancaster, PA 17601-5994

Matrix: Drinking Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 110.2		Color	NELAP	PA	4/4/2005
EPA 150.1		pH	NELAP	PA	2/28/2002
EPA 1613	B	Dioxin	NELAP	PA	10/5/2010
EPA 1664	B	Oil and grease	NELAP	PA	1/27/2014
EPA 1664	A	Oil and grease	NELAP	PA	5/24/2011
EPA 180.1		Turbidity	NELAP	PA	4/4/2005
EPA 200.7	4.4	Aluminum	NELAP	PA	4/4/2005
EPA 200.7	4.4	Barium	NELAP	PA	1/22/2001
EPA 200.7	4.4	Beryllium	NELAP	PA	6/2/2004
EPA 200.7	4.4	Cadmium	NELAP	PA	1/22/2001
EPA 200.7	4.4	Calcium	NELAP	PA	11/28/2001
EPA 200.7	4.4	Chromium	NELAP	PA	1/22/2001
EPA 200.7	4.4	Cobalt	NELAP	PA	10/16/2008
EPA 200.7	4.4	Copper	NELAP	PA	1/22/2001
EPA 200.7	4.4	Iron	NELAP	PA	4/4/2005
EPA 200.7	4.4	Lithium	NELAP	PA	11/13/2012
EPA 200.7	4.4	Magnesium	NELAP	PA	12/4/2007
EPA 200.7	4.4	Manganese	NELAP	PA	4/4/2005
EPA 200.7	4.4	Nickel	NELAP	PA	1/22/2001
EPA 200.7	4.4	Potassium	NELAP	PA	5/24/2011
EPA 200.7	4.4	Silver	NELAP	PA	1/26/2001
EPA 200.7	4.4	Sodium	NELAP	PA	1/22/2001
EPA 200.7	4.4	Strontium	NELAP	PA	5/24/2011
EPA 200.7	4.4	Sulfur	NELAP	PA	11/9/2012
EPA 200.7	4.4	Tin	NELAP	PA	11/3/2008
EPA 200.7	4.4	Vanadium	NELAP	PA	10/16/2008
EPA 200.7	4.4	Zinc	NELAP	PA	4/4/2005
EPA 200.8	5.4	Antimony	NELAP	PA	2/10/2005
EPA 200.8	5.4	Arsenic	NELAP	PA	2/10/2005
EPA 200.8	5.4	Barium	NELAP	PA	11/16/2011
EPA 200.8	5.4	Beryllium	NELAP	PA	2/10/2005
EPA 200.8	5.4	Cadmium	NELAP	PA	2/10/2005
EPA 200.8	5.4	Calcium	NELAP	PA	11/16/2011
EPA 200.8	5.4	Chromium	NELAP	PA	2/10/2005
EPA 200.8	5.4	Copper	NELAP	PA	3/9/2007
EPA 200.8	5.4	Iron	NELAP	PA	11/2/2012
EPA 200.8	5.4	Lead	NELAP	PA	2/10/2005
EPA 200.8	5.4	Magnesium	NELAP	PA	11/2/2012
EPA 200.8	5.4	Manganese	NELAP	PA	11/16/2011

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Drinking Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 200.8	5.4	Nickel	NELAP	PA	2/10/2005
EPA 200.8	5.4	Potassium	NELAP	PA	11/16/2011
EPA 200.8	5.4	Selenium	NELAP	PA	2/10/2005
EPA 200.8	5.4	Sodium	NELAP	PA	11/16/2011
EPA 200.8	5.4	Strontium	NELAP	PA	11/16/2011
EPA 200.8	5.4	Thallium	NELAP	PA	2/10/2005
EPA 200.8	5.4	Zinc	NELAP	PA	11/16/2011
EPA 218.7		Chromium VI	NELAP	PA	11/27/2013
EPA 245.1	3.0	Mercury	NELAP	PA	8/29/2001
EPA 300.0	2.1	Bromide	NELAP	PA	11/9/2012
EPA 300.0	2.1	Chloride	NELAP	PA	5/17/2005
EPA 300.0	2.1	Fluoride	NELAP	PA	1/22/2004
EPA 300.0	2.1	Nitrate as N	NELAP	PA	10/31/2002
EPA 300.0	2.1	Nitrite as N	NELAP	PA	10/31/2002
EPA 300.0	2.1	Sulfate	NELAP	PA	7/7/2003
EPA 335.4		Cyanide	NELAP	PA	7/11/2006
EPA 353.2		Nitrate as N	NELAP	PA	2/28/2002
EPA 353.2		Nitrite as N	NELAP	PA	2/28/2002
EPA 353.2		Total nitrate-nitrite	NELAP	PA	5/24/2011
EPA 504.1	1.1	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	5/17/2005
EPA 504.1	1.1	1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	2/28/2002
EPA 504.1	1.1	1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	1/26/2001
EPA 507	2.1	Alachlor (Lasso)	NELAP	PA	2/28/2002
EPA 507	2.1	Atrazine	NELAP	PA	2/28/2002
EPA 507	2.1	Simazine	NELAP	PA	2/28/2002
EPA 508	3.1	Aldrin (HHDN)	NELAP	PA	5/18/2005
EPA 508	3.1	Aroclor-1016 (PCB-1016)	NELAP	PA	4/24/2007
EPA 508	3.1	Aroclor-1221 (PCB-1221)	NELAP	PA	4/24/2007
EPA 508	3.1	Aroclor-1232 (PCB-1232)	NELAP	PA	4/24/2007
EPA 508	3.1	Aroclor-1242 (PCB-1242)	NELAP	PA	4/24/2007
EPA 508	3.1	Aroclor-1248 (PCB-1248)	NELAP	PA	4/24/2007
EPA 508	3.1	Aroclor-1254 (PCB-1254)	NELAP	PA	4/24/2007
EPA 508	3.1	Aroclor-1260 (PCB-1260)	NELAP	PA	4/24/2007
EPA 508	3.1	Chlordane (tech.)	NELAP	PA	2/28/2002
EPA 508	3.1	Dieldrin	NELAP	PA	1/3/2002
EPA 508	3.1	Endrin	NELAP	PA	2/28/2002
EPA 508	3.1	Heptachlor	NELAP	PA	2/28/2002
EPA 508	3.1	Heptachlor epoxide	NELAP	PA	2/28/2002
EPA 508	3.1	Hexachlorobenzene	NELAP	PA	2/28/2002
EPA 508	3.1	Hexachlorocyclopentadiene	NELAP	PA	2/28/2002
EPA 508	3.1	Methoxychlor	NELAP	PA	2/28/2002
EPA 508	3.1	Toxaphene (Chlorinated camphene)	NELAP	PA	4/14/2015
EPA 508	3.1	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	2/28/2002

Aaron Alger

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Drinking Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 515.1	4.0	2,4,5-TP (Silvex)	NELAP	PA	1/24/2001
EPA 515.1	4.0	2,4-D	NELAP	PA	1/24/2001
EPA 515.1	4.0	Dalapon (2,2-Dichloropropionic acid)	NELAP	PA	1/24/2001
EPA 515.1	4.0	Dicamba	NELAP	PA	1/24/2001
EPA 515.1	4.0	Dinoseb (2-sec-Butyl-4,6-dinitrophenol, DNBP)	NELAP	PA	1/24/2001
EPA 515.1	4.0	Pentachlorophenol (PCP)	NELAP	PA	1/24/2001
EPA 515.1	4.0	Picloram (4-Amino-3,5,6-trichloro-2-pyridinecarboxylic acid)	NELAP	PA	1/24/2001
EPA 524.2	4.1	1,1,1,2-Tetrachloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,1,1-Trichloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,1,2,2-Tetrachloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,1,2-Trichloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,1-Dichloro-2-propanone (1,1-Dichloropropanone)	NELAP	PA	5/17/2005
EPA 524.2	4.1	1,1-Dichloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,1-Dichloropropene	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,2,3-Trichlorobenzene	NELAP	PA	4/4/2005
EPA 524.2	4.1	1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,2,4-Trichlorobenzene	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,2,4-Trimethylbenzene	NELAP	PA	4/4/2005
EPA 524.2	4.1	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,2-Dichloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,2-Dichloropropane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,3,5-Trimethylbenzene	NELAP	PA	5/17/2005
EPA 524.2	4.1	1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,3-Dichloropropane	NELAP	PA	10/31/2002
EPA 524.2	4.1	1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	1-Chlorobutane	NELAP	PA	5/24/2007
EPA 524.2	4.1	2,2-Dichloropropane	NELAP	PA	10/31/2002
EPA 524.2	4.1	2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	5/24/2007
EPA 524.2	4.1	2-Chlorotoluene	NELAP	PA	10/31/2002
EPA 524.2	4.1	2-Hexanone	NELAP	PA	5/24/2007
EPA 524.2	4.1	2-Nitropropane	NELAP	PA	5/24/2007
EPA 524.2	4.1	4-Chlorotoluene	NELAP	PA	10/31/2002
EPA 524.2	4.1	4-Methyl-2-pentanone (MIBK)	NELAP	PA	5/24/2007
EPA 524.2	4.1	Acetone	NELAP	PA	5/24/2007
EPA 524.2	4.1	Acrylonitrile	NELAP	PA	5/24/2007
EPA 524.2	4.1	Allyl chloride (3-Chloropropene)	NELAP	PA	7/3/2007
EPA 524.2	4.1	Benzene	NELAP	PA	10/31/2002
EPA 524.2	4.1	Bromobenzene	NELAP	PA	10/31/2002
EPA 524.2	4.1	Bromochloromethane	NELAP	PA	4/4/2005
EPA 524.2	4.1	Bromodichloromethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	Bromoform	NELAP	PA	10/31/2002
EPA 524.2	4.1	Carbon disulfide	NELAP	PA	5/24/2007

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Drinking Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 524.2	4.1	Carbon tetrachloride	NELAP	PA	10/31/2002
EPA 524.2	4.1	Chloroacetonitrile	NELAP	PA	5/24/2007
EPA 524.2	4.1	Chlorobenzene	NELAP	PA	10/31/2002
EPA 524.2	4.1	Chloroethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	Chloroform	NELAP	PA	10/31/2002
EPA 524.2	4.1	Dibromochloromethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	Dibromomethane	NELAP	PA	10/31/2002
EPA 524.2	4.1	Dichlorodifluoromethane (Freon 12)	NELAP	PA	4/4/2005
EPA 524.2	4.1	Diethyl ether (Ethyl ether)	NELAP	PA	5/24/2007
EPA 524.2	4.1	Diisopropyl ether (DIPE)	NELAP	PA	1/7/2010
EPA 524.2	4.1	Ethyl methacrylate	NELAP	PA	5/24/2007
EPA 524.2	4.1	Ethyl tert-butyl ether (ETBE)	NELAP	PA	1/24/2007
EPA 524.2	4.1	Ethylbenzene	NELAP	PA	10/31/2002
EPA 524.2	4.1	Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	4/4/2005
EPA 524.2	4.1	Hexachloroethane	NELAP	PA	5/24/2007
EPA 524.2	4.1	Isopropylbenzene (Cumene)	NELAP	PA	4/4/2005
EPA 524.2	4.1	Methacrylonitrile	NELAP	PA	5/24/2007
EPA 524.2	4.1	Methyl bromide (Bromomethane)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Methyl chloride (Chloromethane)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Methyl iodide (Iodomethane)	NELAP	PA	5/24/2007
EPA 524.2	4.1	Methyl tert-butyl ether (MTBE)	NELAP	PA	4/4/2005
EPA 524.2	4.1	Methylacrylate	NELAP	PA	5/24/2007
EPA 524.2	4.1	Methylene chloride (Dichloromethane)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Methylmethacrylate	NELAP	PA	5/24/2007
EPA 524.2	4.1	Naphthalene	NELAP	PA	5/17/2005
EPA 524.2	4.1	Nitrobenzene	NELAP	PA	5/17/2005
EPA 524.2	4.1	Pentachloroethane	NELAP	PA	5/24/2007
EPA 524.2	4.1	Propionitrile (Ethyl cyanide)	NELAP	PA	5/24/2007
EPA 524.2	4.1	Styrene	NELAP	PA	10/31/2002
EPA 524.2	4.1	Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Tetrahydrofuran (THF)	NELAP	PA	5/24/2007
EPA 524.2	4.1	Toluene	NELAP	PA	10/31/2002
EPA 524.2	4.1	Total trihalomethanes (TTHMs)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Trichlorofluoromethane (Freon 11)	NELAP	PA	4/4/2005
EPA 524.2	4.1	Vinyl chloride (Chloroethene)	NELAP	PA	10/31/2002
EPA 524.2	4.1	Xylenes, total	NELAP	PA	10/31/2002
EPA 524.2	4.1	cis-1,2-Dichloroethene	NELAP	PA	10/31/2002
EPA 524.2	4.1	cis-1,3-Dichloropropene	NELAP	PA	10/31/2002
EPA 524.2	4.1	m+p-Xylene	NELAP	PA	12/8/2014
EPA 524.2	4.1	n-Butylbenzene	NELAP	PA	4/4/2005
EPA 524.2	4.1	n-Propylbenzene	NELAP	PA	5/17/2005
EPA 524.2	4.1	o-Xylene	NELAP	PA	12/8/2014
EPA 524.2	4.1	p-Isopropyltoluene (4-Isopropyltoluene)	NELAP	PA	5/17/2005
EPA 524.2	4.1	sec-Butylbenzene	NELAP	PA	4/4/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300

PADWIS ID: 36037

Matrix: Drinking Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 524.2	4.1	tert-Amyl methyl ether (TAME)	NELAP	PA	1/24/2007
EPA 524.2	4.1	tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	5/24/2007
EPA 524.2	4.1	tert-Butylbenzene	NELAP	PA	4/4/2005
EPA 524.2	4.1	trans-1,2-Dichloroethene	NELAP	PA	10/31/2002
EPA 524.2	4.1	trans-1,3-Dichloropropene	NELAP	PA	10/31/2002
EPA 524.2	4.1	trans-1,4-Dichloro-2-butene	NELAP	PA	5/24/2007
EPA 525.2	2.0	2,3-Dichlorobiphenyl (BZ 5)	NELAP	PA	5/17/2005
EPA 525.2	2.0	Acenaphthene	NELAP	PA	5/25/2007
EPA 525.2	2.0	Acenaphthylene	NELAP	PA	4/28/2010
EPA 525.2	2.0	Alachlor (Lasso)	NELAP	PA	2/28/2002
EPA 525.2	2.0	Aldrin (HHDN)	NELAP	PA	10/9/2013
EPA 525.2	2.0	Anthracene	NELAP	PA	5/25/2007
EPA 525.2	2.0	Atrazine	NELAP	PA	1/3/2002
EPA 525.2	2.0	Benzo[a]anthracene	NELAP	PA	5/25/2007
EPA 525.2	2.0	Benzo[a]pyrene	NELAP	PA	1/24/2001
EPA 525.2	2.0	Benzo[b]fluoranthene	NELAP	PA	6/4/2007
EPA 525.2	2.0	Benzo[ghi]perylene	NELAP	PA	7/3/2007
EPA 525.2	2.0	Benzo[k]fluoranthene	NELAP	PA	6/4/2007
EPA 525.2	2.0	Benzyl butyl phthalate (Butyl benzyl phthalate)	NELAP	PA	5/25/2007
EPA 525.2	2.0	Butachlor	NELAP	PA	12/19/2002
EPA 525.2	2.0	Chrysene (Benzo[a]phenanthrene)	NELAP	PA	5/25/2007
EPA 525.2	2.0	Di-n-butyl phthalate	NELAP	PA	5/25/2007
EPA 525.2	2.0	Dibenzo[a,h]anthracene	NELAP	PA	5/25/2007
EPA 525.2	2.0	Dieldrin	NELAP	PA	5/17/2005
EPA 525.2	2.0	Diethyl phthalate	NELAP	PA	5/25/2007
EPA 525.2	2.0	Dimethyl phthalate	NELAP	PA	5/25/2007
EPA 525.2	2.0	Endrin	NELAP	PA	5/17/2005
EPA 525.2	2.0	Fluoranthene	NELAP	PA	3/7/2012
EPA 525.2	2.0	Fluorene	NELAP	PA	2/7/2012
EPA 525.2	2.0	Heptachlor	NELAP	PA	5/17/2005
EPA 525.2	2.0	Heptachlor epoxide	NELAP	PA	5/17/2005
EPA 525.2	2.0	Hexachlorobenzene	NELAP	PA	2/11/2005
EPA 525.2	2.0	Hexachlorocyclopentadiene	NELAP	PA	1/24/2001
EPA 525.2	2.0	Indeno(1,2,3-cd)pyrene	NELAP	PA	2/7/2012
EPA 525.2	2.0	Methoxychlor	NELAP	PA	1/24/2001
EPA 525.2	2.0	Metolachlor	NELAP	PA	12/19/2002
EPA 525.2	2.0	Metribuzin	NELAP	PA	12/19/2002
EPA 525.2	2.0	Phenanthrene	NELAP	PA	5/25/2007
EPA 525.2	2.0	Propachlor (Ramrod)	NELAP	PA	1/24/2001
EPA 525.2	2.0	Pyrene	NELAP	PA	5/25/2007
EPA 525.2	2.0	Simazine	NELAP	PA	1/3/2002
EPA 525.2	2.0	bis(2-Ethylhexyl) adipate (di(2-Ethylhexyl) adipate)	NELAP	PA	1/24/2001
EPA 525.2	2.0	bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	1/24/2001

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Drinking Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 525.2	2.0	gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	1/24/2001
EPA 531.1	3.1	3-Hydroxycarbofuran	NELAP	PA	11/7/2006
EPA 531.1	3.1	Aldicarb (Temik)	NELAP	PA	4/14/2015
EPA 531.1	3.1	Aldicarb sulfone	NELAP	PA	1/24/2001
EPA 531.1	3.1	Aldicarb sulfoxide	NELAP	PA	1/24/2001
EPA 531.1	3.1	Carbaryl (Sevin)	NELAP	PA	10/9/2002
EPA 531.1	3.1	Carbofuran (Furaden)	NELAP	PA	1/24/2001
EPA 531.1	3.1	Methomyl (Lannate)	NELAP	PA	1/24/2001
EPA 531.1	3.1	Oxamyl (Vydate)	NELAP	PA	1/24/2001
EPA 8015		Ethane	NELAP	PA	5/24/2011
EPA 8015		Methane	NELAP	PA	5/24/2011
EPA 8015		Propane	NELAP	PA	11/9/2012
SM 2120 B		Color	NELAP	PA	5/25/2005
SM 2130 B		Turbidity	NELAP	PA	5/17/2005
SM 2320 B		Alkalinity as CaCO3	NELAP	PA	1/24/2001
SM 2340 C		Total hardness as CaCO3	NELAP	PA	5/24/2011
SM 2510 B		Conductivity	NELAP	PA	5/17/2005
SM 2540 C		Total dissolved solids (TDS)	NELAP	PA	6/2/2004
SM 2540 D		Residue, nonfilterable (TSS)	NELAP	PA	5/24/2011
SM 2550 B		Temperature, deg. C	NELAP	PA	4/4/2005
SM 4500-Cl F		Total residual chlorine	NELAP	PA	5/24/2011
SM 4500-F- C		Fluoride	NELAP	PA	10/15/2003
SM 4500-H+ B		pH	NELAP	PA	5/16/2007
SM 4500-P E		Orthophosphate as P	NELAP	PA	6/12/2007
SM 4500-SiO2 C	20-22	Silica, dissolved	NELAP	PA	5/24/2007
SM 5310 C		Total organic carbon (TOC)	NELAP	PA	4/18/2013
SM 5540 C		Surfactants as MBAS	NELAP	PA	5/24/2007
SM 9215 B		Heterotrophic bacteria (Enumeration)	NELAP	PA	2/5/2003
SM 9223 Colilert		Total coliform & E. coli (P/A)	NELAP	PA	1/26/2001

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
AK-101		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
AK-102		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
ASTM D7511-09		Total cyanide	NELAP	PA	2/15/2013
EPA 1010		Ignitability	NELAP	PA	12/12/2005
EPA 130.2		Hardness	NELAP	PA	1/19/2005
EPA 1311		Toxicity characteristic leaching procedure (TCLP)	NELAP	PA	12/12/2005
EPA 1312		Synthetic precipitation leaching procedure (SPLP)	NELAP	PA	12/12/2005
EPA 160.1		Residue, filterable (TDS)	NELAP	PA	1/19/2005
EPA 160.4		Residue, volatile	NELAP	PA	1/19/2005

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1613	B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	NELAP	PA	6/30/2010
EPA 1613	B	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	NELAP	PA	6/30/2010
EPA 1613	B	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 1613	B	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	NELAP	PA	6/30/2010
EPA 1613	B	2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)(Dioxin)	NELAP	PA	6/30/2010
EPA 1613	B	2,3,7,8-Tetrachlorodibenzofuran (TCDF)	NELAP	PA	6/30/2010
EPA 1613	B	Total heptachlorodibenzo-p-dioxin (HpCDD)	NELAP	PA	8/6/2010
EPA 1613	B	Total heptachlorodibenzofuran (HpCDF)	NELAP	PA	8/6/2010
EPA 1613	B	Total hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	8/6/2010
EPA 1613	B	Total hexachlorodibenzofuran (HxCDF)	NELAP	PA	8/6/2010
EPA 1613	B	Total pentachlorodibenzo-p-dioxin (PeCDD)	NELAP	PA	8/6/2010
EPA 1613	B	Total pentachlorodibenzofuran (PeCDF)	NELAP	PA	8/6/2010
EPA 1613	B	Total tetrachlorodibenzo-p-dioxin (TCDD)	NELAP	PA	8/6/2010
EPA 1613	B	Total tetrachlorodibenzofuran (TCDF)	NELAP	PA	8/6/2010
EPA 1625	C	N-Nitrosodimethylamine	NELAP	PA	11/23/2010
EPA 1631	E	Mercury	NELAP	PA	10/16/2014
EPA 1664	A	Non-polar material	NELAP	PA	11/17/2006
EPA 1664	A	Oil and grease	NELAP	PA	1/19/2005
EPA 1664	B	Oil and grease	NELAP	PA	1/27/2014
EPA 1666	A	4-Methyl-2-pentanone (MIBK)	NELAP	PA	12/12/2005
EPA 1666	A	Diisopropyl ether (DIPE)	NELAP	PA	1/19/2005
EPA 1666	A	Ethyl acetate	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1666	A	Isobutyraldehyde	NELAP	PA	1/19/2005
EPA 1666	A	Isopropyl acetate	NELAP	PA	1/19/2005
EPA 1666	A	Isopropyl alcohol (2-Propanol)	NELAP	PA	12/2/2009
EPA 1666	A	Methyl formate	NELAP	PA	1/19/2005
EPA 1666	A	Tetrahydrofuran (THF)	NELAP	PA	1/19/2005
EPA 1666	A	Xylenes, total	NELAP	PA	1/19/2005
EPA 1666	A	n-Amyl acetate (n-Pentyl acetate)	NELAP	PA	4/4/2005
EPA 1666	A	n-Amyl alcohol (1-Pentanol)	NELAP	PA	4/4/2005
EPA 1666	A	n-Butyl acetate	NELAP	PA	4/4/2005
EPA 1666	A	n-Heptane	NELAP	PA	1/19/2005
EPA 1666	A	n-Hexane	NELAP	PA	1/19/2005
EPA 1666	A	tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	4/4/2005
EPA 1668		2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ 206)	NELAP	PA	2/1/2013
EPA 1668		2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ 194)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ 196)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ 207)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ 195)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ 170)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',6,6'-Octachlorobiphenyl (BZ 197)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ 171)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4'-Hexachlorobiphenyl (BZ 128)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ 177)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ 201)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ 175)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5'-Hexachlorobiphenyl (BZ 130)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ 199)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ 208)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5',6-Octachlorobiphenyl (BZ 198)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ 172)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ 174)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ 200)	NELAP	PA	12/17/2012

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ 173)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5-Hexachlorobiphenyl (BZ 129)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,6'-Hexachlorobiphenyl (BZ 132)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ 176)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,6-Hexachlorobiphenyl (BZ 131)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4-Pentachlorobiphenyl (BZ 82)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ 202)	NELAP	PA	2/1/2013
EPA 1668		2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ 178)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,5'-Hexachlorobiphenyl (BZ 133)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,6'-Hexachlorobiphenyl (BZ 135)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ 179)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,6-Hexachlorobiphenyl (BZ 134)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5-Pentachlorobiphenyl (BZ 83)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',6,6'-Hexachlorobiphenyl (BZ 136)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',6-Pentachlorobiphenyl (BZ 84)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3'-Tetrachlorobiphenyl (BZ 40)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5',6-Hexachlorobiphenyl (BZ 149)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5'-Pentachlorobiphenyl (BZ 97)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,5',6-Heptachlorobiphenyl (BZ 187)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,5'-Hexachlorobiphenyl (BZ 146)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,6'-Hexachlorobiphenyl (BZ 148)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ 188)	NELAP	PA	2/1/2013
EPA 1668		2,2',3,4',5,6-Hexachlorobiphenyl (BZ 147)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5-Pentachlorobiphenyl (BZ 90)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',6'-Pentachlorobiphenyl (BZ 98)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',6,6'-Hexachlorobiphenyl (BZ 150)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',6-Pentachlorobiphenyl (BZ 91)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4'-Tetrachlorobiphenyl (BZ 42)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5',6-Heptachlorobiphenyl (BZ 183)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5'-Hexachlorobiphenyl (BZ 138)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ 203)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ 180)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ 182)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ 204)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ 181)	NELAP	PA	12/17/2012

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,2',3,4,4',5-Hexachlorobiphenyl (BZ 137)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',6'-Hexachlorobiphenyl (BZ 140)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ 184)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',6-Hexachlorobiphenyl (BZ 139)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4'-Pentachlorobiphenyl (BZ 85)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5',6-Hexachlorobiphenyl (BZ 144)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5'-Pentachlorobiphenyl (BZ 87)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ 185)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,5'-Hexachlorobiphenyl (BZ 141)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,6'-Hexachlorobiphenyl (BZ 143)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ 186)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,6-Hexachlorobiphenyl (BZ 142)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5-Pentachlorobiphenyl (BZ 86)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,6'-Pentachlorobiphenyl (BZ 89)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,6,6'-Hexachlorobiphenyl (BZ 145)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,6-Pentachlorobiphenyl (BZ 88)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4-Tetrachlorobiphenyl (BZ 41)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5',6-Pentachlorobiphenyl (BZ 95)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5'-Tetrachlorobiphenyl (BZ 44)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,5',6-Hexachlorobiphenyl (BZ 151)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,5'-Pentachlorobiphenyl (BZ 92)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,6'-Pentachlorobiphenyl (BZ 94)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,6,6'-Hexachlorobiphenyl (BZ 152)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,6-Pentachlorobiphenyl (BZ 93)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5-Tetrachlorobiphenyl (BZ 43)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,6'-Tetrachlorobiphenyl (BZ 46)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,6,6'-Pentachlorobiphenyl (BZ 96)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,6-Tetrachlorobiphenyl (BZ 45)	NELAP	PA	12/17/2012
EPA 1668		2,2',3-Trichlorobiphenyl (BZ 16)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',5,5'-Hexachlorobiphenyl (BZ 153)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',5,6'-Hexachlorobiphenyl (BZ 154)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',5-Pentachlorobiphenyl (BZ 99)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',6,6'-Hexachlorobiphenyl (BZ 155)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',6-Pentachlorobiphenyl (BZ 100)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4'-Tetrachlorobiphenyl (BZ 47)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5',6-Pentachlorobiphenyl (BZ 103)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5'-Tetrachlorobiphenyl (BZ 49)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5,5'-Pentachlorobiphenyl (BZ 101)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5,6'-Pentachlorobiphenyl (BZ 102)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5-Tetrachlorobiphenyl (BZ 48)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,6'-Tetrachlorobiphenyl (BZ 51)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,6,6'-Pentachlorobiphenyl (BZ 104)	NELAP	PA	2/1/2013
EPA 1668		2,2',4,6-Tetrachlorobiphenyl (BZ 50)	NELAP	PA	12/17/2012

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,2',4-Trichlorobiphenyl (BZ 17)	NELAP	PA	12/17/2012
EPA 1668		2,2',5,5'-Tetrachlorobiphenyl (BZ 52)	NELAP	PA	12/17/2012
EPA 1668		2,2',5,6'-Tetrachlorobiphenyl (BZ 53)	NELAP	PA	12/17/2012
EPA 1668		2,2',5-Trichlorobiphenyl (BZ 18)	NELAP	PA	12/17/2012
EPA 1668		2,2',6,6'-Tetrachlorobiphenyl (BZ 54)	NELAP	PA	12/17/2012
EPA 1668		2,2',6-Trichlorobiphenyl (BZ 19)	NELAP	PA	12/17/2012
EPA 1668		2,2'-Dichlorobiphenyl (BZ 4)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5',6-Pentachlorobiphenyl (BZ 125)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5'-Tetrachlorobiphenyl (BZ 76)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5,5'-Pentachlorobiphenyl (BZ 124)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5-Tetrachlorobiphenyl (BZ 70)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',6-Tetrachlorobiphenyl (BZ 71)	NELAP	PA	12/17/2012
EPA 1668		2,3',4'-Trichlorobiphenyl (BZ 33)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5',6-Hexachlorobiphenyl (BZ 168)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5'-Pentachlorobiphenyl (BZ 123)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5,5'-Hexachlorobiphenyl (BZ 167)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5-Pentachlorobiphenyl (BZ 118)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',6-Pentachlorobiphenyl (BZ 119)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4'-Tetrachlorobiphenyl (BZ 66)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5',6-Pentachlorobiphenyl (BZ 121)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5'-Tetrachlorobiphenyl (BZ 68)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5,5'-Pentachlorobiphenyl (BZ 120)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5-Tetrachlorobiphenyl (BZ 67)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,6-Tetrachlorobiphenyl (BZ 69)	NELAP	PA	12/17/2012
EPA 1668		2,3',4-Trichlorobiphenyl (BZ 25)	NELAP	PA	12/17/2012
EPA 1668		2,3',5',6-Tetrachlorobiphenyl (BZ 73)	NELAP	PA	12/17/2012
EPA 1668		2,3',5'-Trichlorobiphenyl (BZ 34)	NELAP	PA	12/17/2012
EPA 1668		2,3',5,5'-Tetrachlorobiphenyl (BZ 72)	NELAP	PA	12/17/2012
EPA 1668		2,3',5-Trichlorobiphenyl (BZ 26)	NELAP	PA	12/17/2012
EPA 1668		2,3',6-Trichlorobiphenyl (BZ 27)	NELAP	PA	12/17/2012
EPA 1668		2,3'-Dichlorobiphenyl (BZ 6)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5',6-Hexachlorobiphenyl (BZ 164)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5'-Pentachlorobiphenyl (BZ 122)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ 193)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5,5'-Hexachlorobiphenyl (BZ 162)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5,6-Hexachlorobiphenyl (BZ 163)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5-Pentachlorobiphenyl (BZ 107)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',6-Pentachlorobiphenyl (BZ 110)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4'-Tetrachlorobiphenyl (BZ 56)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ 191)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5'-Hexachlorobiphenyl (BZ 157)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ 205)	NELAP	PA	2/1/2013

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ 189)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ 190)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5-Hexachlorobiphenyl (BZ 156)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',6-Hexachlorobiphenyl (BZ 158)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4'-Pentachlorobiphenyl (BZ 105)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5',6-Hexachlorobiphenyl (BZ 161)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5'-Pentachlorobiphenyl (BZ 108)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ 192)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5,5'-Hexachlorobiphenyl (BZ 159)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5,6-Hexachlorobiphenyl (BZ 160)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5-Pentachlorobiphenyl (BZ 106)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,6-Pentachlorobiphenyl (BZ 109)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4-Tetrachlorobiphenyl (BZ 55)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5',6-Pentachlorobiphenyl (BZ 113)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5'-Tetrachlorobiphenyl (BZ 58)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5,5',6-Hexachlorobiphenyl (BZ 165)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5,5'-Pentachlorobiphenyl (BZ 111)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5,6-Pentachlorobiphenyl (BZ 112)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5-Tetrachlorobiphenyl (BZ 57)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',6-Tetrachlorobiphenyl (BZ 59)	NELAP	PA	12/17/2012
EPA 1668		2,3,3'-Trichlorobiphenyl (BZ 20)	NELAP	PA	12/17/2012
EPA 1668		2,3,4',5,6-Pentachlorobiphenyl (BZ 117)	NELAP	PA	12/17/2012
EPA 1668		2,3,4',5-Tetrachlorobiphenyl (BZ 63)	NELAP	PA	12/17/2012
EPA 1668		2,3,4',6-Tetrachlorobiphenyl (BZ 64)	NELAP	PA	12/17/2012
EPA 1668		2,3,4'-Trichlorobiphenyl (BZ 22)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4',5,6-Hexachlorobiphenyl (BZ 166)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4',5-Pentachlorobiphenyl (BZ 114)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4',6-Pentachlorobiphenyl (BZ 115)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4'-Tetrachlorobiphenyl (BZ 60)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,5,6-Pentachlorobiphenyl (BZ 116)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,5-Tetrachlorobiphenyl (BZ 61)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,6-Tetrachlorobiphenyl (BZ 62)	NELAP	PA	12/17/2012
EPA 1668		2,3,4-Trichlorobiphenyl (BZ 21)	NELAP	PA	12/17/2012
EPA 1668		2,3,5,6-Tetrachlorobiphenyl (BZ 65)	NELAP	PA	12/17/2012
EPA 1668		2,3,5-Trichlorobiphenyl (BZ 23)	NELAP	PA	12/17/2012
EPA 1668		2,3,6-Trichlorobiphenyl (BZ 24)	NELAP	PA	12/17/2012
EPA 1668		2,3-Dichlorobiphenyl (BZ 5)	NELAP	PA	12/17/2012
EPA 1668		2,4',5-Trichlorobiphenyl (BZ 31)	NELAP	PA	12/17/2012
EPA 1668		2,4',6-Trichlorobiphenyl (BZ 32)	NELAP	PA	12/17/2012
EPA 1668		2,4'-Dichlorobiphenyl (BZ 8)	NELAP	PA	12/17/2012
EPA 1668		2,4,4',5-Tetrachlorobiphenyl (BZ 74)	NELAP	PA	12/17/2012
EPA 1668		2,4,4',6-Tetrachlorobiphenyl (BZ 75)	NELAP	PA	12/17/2012
EPA 1668		2,4,4'-Trichlorobiphenyl (BZ 28)	NELAP	PA	12/17/2012

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,4,5-Trichlorobiphenyl (BZ 29)	NELAP	PA	12/17/2012
EPA 1668		2,4,6-Trichlorobiphenyl (BZ 30)	NELAP	PA	12/17/2012
EPA 1668		2,4-Dichlorobiphenyl (BZ 7)	NELAP	PA	12/17/2012
EPA 1668		2,5-Dichlorobiphenyl (BZ 9)	NELAP	PA	12/17/2012
EPA 1668		2,6-Dichlorobiphenyl (BZ 10)	NELAP	PA	12/17/2012
EPA 1668		2-Chlorobiphenyl (BZ 1)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,4',5,5'-Hexachlorobiphenyl (BZ 169)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,4',5-Pentachlorobiphenyl (BZ 126)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,4'-Tetrachlorobiphenyl (BZ 77)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,5'-Tetrachlorobiphenyl (BZ 79)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,5,5'-Pentachlorobiphenyl (BZ 127)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,5-Tetrachlorobiphenyl (BZ 78)	NELAP	PA	12/17/2012
EPA 1668		3,3',4-Trichlorobiphenyl (BZ 35)	NELAP	PA	12/17/2012
EPA 1668		3,3',5,5'-Tetrachlorobiphenyl (BZ 80)	NELAP	PA	12/17/2012
EPA 1668		3,3',5-Trichlorobiphenyl (BZ 36)	NELAP	PA	12/17/2012
EPA 1668		3,3'-Dichlorobiphenyl (BZ 11)	NELAP	PA	12/17/2012
EPA 1668		3,4',5-Trichlorobiphenyl (BZ 39)	NELAP	PA	12/17/2012
EPA 1668		3,4'-Dichlorobiphenyl (BZ 13)	NELAP	PA	12/17/2012
EPA 1668		3,4,4',5-Tetrachlorobiphenyl (BZ 81)	NELAP	PA	12/17/2012
EPA 1668		3,4,4'-Trichlorobiphenyl (BZ 37)	NELAP	PA	12/17/2012
EPA 1668		3,4,5-Trichlorobiphenyl (BZ 38)	NELAP	PA	12/17/2012
EPA 1668		3,4-Dichlorobiphenyl (BZ 12)	NELAP	PA	12/17/2012
EPA 1668		3,5-Dichlorobiphenyl (BZ 14)	NELAP	PA	12/17/2012
EPA 1668		3-Chlorobiphenyl (BZ 2)	NELAP	PA	12/17/2012
EPA 1668		4,4'-Dichlorobiphenyl (BZ 15)	NELAP	PA	12/17/2012
EPA 1668		4-Chlorobiphenyl (BZ 3)	NELAP	PA	12/17/2012
EPA 1668		Decachlorobiphenyl	NELAP	PA	2/1/2013
EPA 1668	A	PCBs as congeners by HRGC/HRMS	NELAP	PA	3/4/2015
EPA 1668	C	PCBs as congeners by HRGC/HRMS	NELAP	PA	3/4/2015
EPA 1671	A	Acetonitrile	NELAP	PA	1/19/2005
EPA 1671	A	Diethylamine	NELAP	PA	1/19/2005
EPA 1671	A	Dimethyl sulfoxide	NELAP	PA	1/19/2005
EPA 1671	A	Ethanol	NELAP	PA	1/19/2005
EPA 1671	A	Methanol	NELAP	PA	1/19/2005
EPA 1671	A	Methyl cellosolve (2-Methoxyethanol)	NELAP	PA	1/19/2005
EPA 1671	A	Triethylamine	NELAP	PA	1/19/2005
EPA 1671	A	n-Propanol (1-Propanol)	NELAP	PA	1/19/2005
EPA 170.1		Temperature, deg. C	NELAP	PA	4/4/2005
EPA 180.1		Turbidity	NELAP	PA	1/19/2005
EPA 200.2		Metals sample preparation	NELAP	PA	1/24/2007
EPA 200.7	4.4	Aluminum	NELAP	PA	1/19/2005
EPA 200.7	4.4	Antimony	NELAP	PA	1/19/2005
EPA 200.7	4.4	Arsenic	NELAP	PA	1/19/2005
EPA 200.7	4.4	Barium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Beryllium	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 200.7	4.4	Boron	NELAP	PA	1/19/2005
EPA 200.7	4.4	Cadmium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Calcium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Chromium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Cobalt	NELAP	PA	1/19/2005
EPA 200.7	4.4	Copper	NELAP	PA	1/19/2005
EPA 200.7	4.4	Iron	NELAP	PA	1/19/2005
EPA 200.7	4.4	Lead	NELAP	PA	1/19/2005
EPA 200.7	4.4	Lithium	NELAP	PA	2/7/2012
EPA 200.7	4.4	Magnesium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Manganese	NELAP	PA	1/19/2005
EPA 200.7	4.4	Molybdenum	NELAP	PA	1/19/2005
EPA 200.7	4.4	Nickel	NELAP	PA	1/19/2005
EPA 200.7	4.4	Potassium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Selenium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Silver	NELAP	PA	4/4/2005
EPA 200.7	4.4	Sodium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Strontium	NELAP	PA	5/24/2011
EPA 200.7	4.4	Thallium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Tin	NELAP	PA	1/19/2005
EPA 200.7	4.4	Titanium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Vanadium	NELAP	PA	1/19/2005
EPA 200.7	4.4	Zinc	NELAP	PA	1/19/2005
EPA 200.7	4.4	Zirconium	NELAP	PA	7/29/2015
EPA 200.8	5.4	Aluminum	NELAP	PA	1/7/2010
EPA 200.8	5.4	Antimony	NELAP	PA	4/4/2005
EPA 200.8	5.4	Arsenic	NELAP	PA	4/4/2005
EPA 200.8	5.4	Barium	NELAP	PA	4/4/2005
EPA 200.8	5.4	Beryllium	NELAP	PA	4/4/2005
EPA 200.8	5.4	Boron	NELAP	PA	1/11/2012
EPA 200.8	5.4	Cadmium	NELAP	PA	4/4/2005
EPA 200.8	5.4	Calcium	NELAP	PA	1/7/2010
EPA 200.8	5.4	Chromium	NELAP	PA	4/4/2005
EPA 200.8	5.4	Cobalt	NELAP	PA	11/23/2010
EPA 200.8	5.4	Copper	NELAP	PA	4/4/2005
EPA 200.8	5.4	Iron	NELAP	PA	11/23/2010
EPA 200.8	5.4	Lead	NELAP	PA	4/4/2005
EPA 200.8	5.4	Magnesium	NELAP	PA	1/7/2010
EPA 200.8	5.4	Manganese	NELAP	PA	11/23/2010
EPA 200.8	5.4	Molybdenum	NELAP	PA	1/7/2010
EPA 200.8	5.4	Nickel	NELAP	PA	4/4/2005
EPA 200.8	5.4	Potassium	NELAP	PA	1/7/2010
EPA 200.8	5.4	Selenium	NELAP	PA	12/12/2005
EPA 200.8	5.4	Silver	NELAP	PA	1/2/2007
EPA 200.8	5.4	Sodium	NELAP	PA	1/7/2010

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 200.8	5.4	Strontium	NELAP	PA	1/7/2010
EPA 200.8	5.4	Thallium	NELAP	PA	5/31/2006
EPA 200.8	5.4	Tin	NELAP	PA	1/7/2010
EPA 200.8	5.4	Titanium	NELAP	PA	1/7/2010
EPA 200.8	5.4	Vanadium	NELAP	PA	1/7/2010
EPA 200.8	5.4	Zinc	NELAP	PA	1/18/2011
EPA 218.6		Chromium VI	NELAP	PA	4/4/2005
EPA 245.1	3.0	Mercury	NELAP	PA	1/19/2005
EPA 300.0	2.1	Bromide	NELAP	PA	4/4/2005
EPA 300.0	2.1	Chloride	NELAP	PA	1/19/2005
EPA 300.0	2.1	Fluoride	NELAP	PA	5/25/2005
EPA 300.0	2.1	Nitrate as N	NELAP	PA	1/19/2005
EPA 300.0	2.1	Nitrite as N	NELAP	PA	1/19/2005
EPA 300.0	2.1	Sulfate	NELAP	PA	1/19/2005
EPA 3005	A	Preconcentration under acid	NELAP	PA	12/12/2005
EPA 3010	A	Hot plate acid digestion (HNO3 + HCl)	NELAP	PA	12/12/2005
EPA 3020	A	Hot plate acid digestion (HNO3 only)	NELAP	PA	12/12/2005
EPA 305.2		Acidity as CaCO3	NELAP	PA	1/24/2007
EPA 3060	A	Alkaline digestion of Cr(VI)	NELAP	PA	1/24/2007
EPA 335.4		Total cyanide	NELAP	PA	1/19/2005
EPA 350.1		Ammonia as N	NELAP	PA	10/9/2013
EPA 351.2		Kjeldahl nitrogen, total (TKN)	NELAP	PA	1/19/2005
EPA 3510	C	Separatory funnel liquid-liquid extraction	NELAP	PA	12/12/2005
EPA 3511		Organic compounds in water by microextraction	NELAP	PA	3/7/2012
EPA 3520	C	Continuous liquid-liquid extraction	NELAP	PA	12/12/2005
EPA 353.2		Nitrate as N	NELAP	PA	1/19/2005
EPA 353.2		Nitrite as N	NELAP	PA	1/19/2005
EPA 353.2		Total nitrate-nitrite	NELAP	PA	4/4/2005
EPA 3620	B	Florisil cleanup	NELAP	PA	12/12/2005
EPA 3630	C	Silica gel cleanup	NELAP	PA	12/12/2005
EPA 3640	A	Gel permeation cleanup (GPC)	NELAP	PA	12/12/2005
EPA 365.1		Phosphorus, total	NELAP	PA	4/4/2005
EPA 365.3		Orthophosphate as P	NELAP	PA	1/19/2005
EPA 3660	B	Sulfur cleanup	NELAP	PA	12/12/2005
EPA 375.4		Sulfate	NELAP	PA	4/4/2005
EPA 410.4		Chemical oxygen demand (COD)	NELAP	PA	4/1/2005
EPA 415.1		Total organic carbon (TOC)	NELAP	PA	1/19/2005
EPA 420.4		Total phenolics	NELAP	PA	4/17/2007
EPA 425.1		Surfactants as MBAS	NELAP	PA	1/19/2005
EPA 5030	C	Aqueous-phase purge-and-trap	NELAP	PA	1/27/2014
EPA 5030	B	Aqueous-phase purge-and-trap	NELAP	PA	12/12/2005
EPA 524.2	4.1	1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	1/18/2011
EPA 524.2	4.1	1,2-Dichloroethane	NELAP	PA	1/18/2011
EPA 524.2	4.1	4-Methyl-2-pentanone (MIBK)	NELAP	PA	5/24/2011
EPA 524.2	4.1	Acetone	NELAP	PA	1/18/2011

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DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 524.2	4.1	Benzene	NELAP	PA	1/18/2011
EPA 524.2	4.1	Chlorobenzene	NELAP	PA	1/18/2011
EPA 524.2	4.1	Chloroform	NELAP	PA	1/18/2011
EPA 524.2	4.1	Methylene chloride (Dichloromethane)	NELAP	PA	5/24/2011
EPA 524.2	4.1	Tetrahydrofuran (THF)	NELAP	PA	5/24/2011
EPA 524.2	4.1	Toluene	NELAP	PA	1/18/2011
EPA 524.2	4.1	m+p-Xylene	NELAP	PA	7/25/2011
EPA 524.2	4.1	o-Xylene	NELAP	PA	5/24/2011
EPA 6010		Aluminum	NELAP	PA	12/12/2005
EPA 6010		Antimony	NELAP	PA	12/12/2005
EPA 6010		Arsenic	NELAP	PA	12/12/2005
EPA 6010		Barium	NELAP	PA	12/12/2005
EPA 6010		Beryllium	NELAP	PA	12/12/2005
EPA 6010		Boron	NELAP	PA	12/12/2005
EPA 6010		Cadmium	NELAP	PA	12/12/2005
EPA 6010		Calcium	NELAP	PA	12/12/2005
EPA 6010		Chromium	NELAP	PA	12/12/2005
EPA 6010		Cobalt	NELAP	PA	12/12/2005
EPA 6010		Copper	NELAP	PA	12/12/2005
EPA 6010		Iron	NELAP	PA	12/12/2005
EPA 6010		Lead	NELAP	PA	12/12/2005
EPA 6010		Lithium	NELAP	PA	1/18/2011
EPA 6010		Magnesium	NELAP	PA	12/12/2005
EPA 6010		Manganese	NELAP	PA	12/12/2005
EPA 6010	C	Metals by ICP/AES	NELAP	PA	3/26/2012
EPA 6010	B	Metals by ICP/AES	NELAP	PA	3/26/2012
EPA 6010		Molybdenum	NELAP	PA	12/12/2005
EPA 6010		Nickel	NELAP	PA	12/12/2005
EPA 6010		Potassium	NELAP	PA	12/12/2005
EPA 6010		Selenium	NELAP	PA	12/12/2005
EPA 6010		Silver	NELAP	PA	12/12/2005
EPA 6010		Sodium	NELAP	PA	12/12/2005
EPA 6010		Strontium	NELAP	PA	12/12/2005
EPA 6010		Sulfur	NELAP	PA	12/19/2011
EPA 6010		Thallium	NELAP	PA	12/12/2005
EPA 6010		Tin	NELAP	PA	12/12/2005
EPA 6010		Titanium	NELAP	PA	12/12/2005
EPA 6010		Vanadium	NELAP	PA	12/12/2005
EPA 6010		Zinc	NELAP	PA	12/12/2005
EPA 6010		Zirconium	NELAP	PA	7/29/2015
EPA 602		Benzene	NELAP	PA	1/19/2005
EPA 602		Ethylbenzene	NELAP	PA	1/19/2005
EPA 602		Methyl tert-butyl ether (MTBE)	NELAP	PA	1/19/2005
EPA 602		Naphthalene	NELAP	PA	1/18/2011
EPA 602		Styrene	NELAP	PA	6/24/2008

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PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 602		Toluene	NELAP	PA	1/19/2005
EPA 602		Xylenes, total	NELAP	PA	1/19/2005
EPA 602		m+p-Xylene	NELAP	PA	1/18/2011
EPA 602		o-Xylene	NELAP	PA	1/18/2011
EPA 6020		Aluminum	NELAP	PA	1/7/2010
EPA 6020		Antimony	NELAP	PA	12/12/2005
EPA 6020		Arsenic	NELAP	PA	12/12/2005
EPA 6020		Barium	NELAP	PA	12/12/2005
EPA 6020		Beryllium	NELAP	PA	12/12/2005
EPA 6020		Boron	NELAP	PA	1/11/2012
EPA 6020		Cadmium	NELAP	PA	12/12/2005
EPA 6020		Calcium	NELAP	PA	1/7/2010
EPA 6020		Chromium	NELAP	PA	12/12/2005
EPA 6020		Cobalt	NELAP	PA	11/23/2010
EPA 6020		Copper	NELAP	PA	12/12/2005
EPA 6020		Iron	NELAP	PA	11/23/2010
EPA 6020		Lead	NELAP	PA	12/12/2005
EPA 6020		Magnesium	NELAP	PA	1/7/2010
EPA 6020		Manganese	NELAP	PA	11/23/2010
EPA 6020	A	Metals by ICP/MS	NELAP	PA	3/26/2012
EPA 6020		Molybdenum	NELAP	PA	1/7/2010
EPA 6020		Nickel	NELAP	PA	7/23/2008
EPA 6020		Potassium	NELAP	PA	1/7/2010
EPA 6020		Selenium	NELAP	PA	12/12/2005
EPA 6020		Silver	NELAP	PA	1/12/2007
EPA 6020		Sodium	NELAP	PA	1/7/2010
EPA 6020		Strontium	NELAP	PA	1/7/2010
EPA 6020		Thallium	NELAP	PA	12/12/2005
EPA 6020		Tin	NELAP	PA	1/7/2010
EPA 6020		Titanium	NELAP	PA	1/7/2010
EPA 6020		Vanadium	NELAP	PA	1/7/2010
EPA 6020		Zinc	NELAP	PA	1/18/2011
EPA 608		4,4'-DDD	NELAP	PA	1/19/2005
EPA 608		4,4'-DDE	NELAP	PA	1/19/2005
EPA 608		4,4'-DDT	NELAP	PA	1/19/2005
EPA 608		Aldrin (HHDN)	NELAP	PA	1/19/2005
EPA 608		Aroclor-1016 (PCB-1016)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1221 (PCB-1221)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1232 (PCB-1232)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1242 (PCB-1242)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1248 (PCB-1248)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1254 (PCB-1254)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1260 (PCB-1260)	NELAP	PA	12/11/2006
EPA 608		Aroclor-1268 (PCB-1268)	NELAP	PA	11/13/2012
EPA 608		Chlordane (tech.)	NELAP	PA	1/19/2005

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 608		Dieldrin	NELAP	PA	1/19/2005
EPA 608		Endosulfan I	NELAP	PA	1/19/2005
EPA 608		Endosulfan II	NELAP	PA	1/19/2005
EPA 608		Endosulfan sulfate	NELAP	PA	1/19/2005
EPA 608		Endrin	NELAP	PA	1/19/2005
EPA 608		Endrin aldehyde	NELAP	PA	1/19/2005
EPA 608		Heptachlor	NELAP	PA	1/19/2005
EPA 608		Heptachlor epoxide	NELAP	PA	1/19/2005
EPA 608		Methoxychlor	NELAP	PA	5/2/2006
EPA 608		Mirex	NELAP	PA	11/13/2012
EPA 608		Toxaphene (Chlorinated camphene)	NELAP	PA	1/19/2005
EPA 608		alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 608		beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 608		delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 608		gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 622		Azinphos-methyl (Guthion)	NELAP	PA	6/15/2009
EPA 622		Bolstar (Sulprofos)	NELAP	PA	6/15/2009
EPA 622		Carbophenothion (Trithion)	NELAP	PA	4/28/2010
EPA 622		Chlorpyrifos	NELAP	PA	6/15/2009
EPA 622		Coumaphos	NELAP	PA	6/15/2009
EPA 622		Demeton-O	NELAP	PA	6/15/2009
EPA 622		Demeton-S	NELAP	PA	6/15/2009
EPA 622		Diazinon (Spectracide)	NELAP	PA	6/15/2009
EPA 622		Dichlorovos (DDVP, Dichlorvos)	NELAP	PA	6/15/2009
EPA 622		Disulfoton	NELAP	PA	6/15/2009
EPA 622		EPN (Santox)	NELAP	PA	6/15/2009
EPA 622		Ethion	NELAP	PA	6/15/2009
EPA 622		Ethoprop (Prophos)	NELAP	PA	6/15/2009
EPA 622		Famphur	NELAP	PA	6/15/2009
EPA 622		Fensulfothion	NELAP	PA	6/15/2009
EPA 622		Fenthion	NELAP	PA	6/15/2009
EPA 622		Malathion	NELAP	PA	6/15/2009
EPA 622		Merphos	NELAP	PA	6/15/2009
EPA 622		Methyl parathion (Parathion, methyl)	NELAP	PA	6/15/2009
EPA 622		Mevinphos	NELAP	PA	6/15/2009
EPA 622		Naled	NELAP	PA	6/15/2009
EPA 622		Parathion, ethyl (Ethyl parathion, Parathion)	NELAP	PA	6/15/2009
EPA 622		Phorate (Thimet)	NELAP	PA	6/15/2009
EPA 622		Ronnel	NELAP	PA	6/15/2009
EPA 622		Stirophos (Tetrachlorovinphos)	NELAP	PA	6/15/2009
EPA 622		Tokuthion (Prothiophos)	NELAP	PA	6/15/2009
EPA 622		Trichloronate	NELAP	PA	6/15/2009
EPA 624		1,1,1,2-Tetrachloroethane	NELAP	PA	1/19/2005
EPA 624		1,1,1-Trichloroethane	NELAP	PA	1/19/2005
EPA 624		1,1,2,2-Tetrachloroethane	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 624		1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NELAP	PA	7/3/2007
EPA 624		1,1,2-Trichloroethane	NELAP	PA	1/19/2005
EPA 624		1,1-Dichloroethane	NELAP	PA	1/19/2005
EPA 624		1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	1/19/2005
EPA 624		1,1-Dichloropropene	NELAP	PA	7/3/2007
EPA 624		1,2,3-Trichlorobenzene	NELAP	PA	7/3/2007
EPA 624		1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	7/3/2007
EPA 624		1,2,3-Trimethylbenzene	NELAP	PA	7/3/2007
EPA 624		1,2,4-Trichlorobenzene	NELAP	PA	7/3/2007
EPA 624		1,2,4-Trimethylbenzene	NELAP	PA	7/3/2007
EPA 624		1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	7/3/2007
EPA 624		1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	7/3/2007
EPA 624		1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 624		1,2-Dichloroethane	NELAP	PA	1/19/2005
EPA 624		1,2-Dichloropropane	NELAP	PA	1/19/2005
EPA 624		1,3,5-Trimethylbenzene	NELAP	PA	7/3/2007
EPA 624		1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 624		1,3-Dichloropropane	NELAP	PA	7/3/2007
EPA 624		1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 624		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	7/3/2007
EPA 624		2,2-Dichloropropane	NELAP	PA	7/3/2007
EPA 624		2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	7/3/2007
EPA 624		2-Chloroethyl vinyl ether	NELAP	PA	1/19/2005
EPA 624		2-Chlorotoluene	NELAP	PA	7/3/2007
EPA 624		2-Hexanone	NELAP	PA	7/3/2007
EPA 624		4-Chloro-2-nitrophenol	NELAP	PA	7/3/2007
EPA 624		4-Chlorotoluene	NELAP	PA	7/3/2007
EPA 624		4-Methyl-2-pentanone (MIBK)	NELAP	PA	5/2/2006
EPA 624		Acetone	NELAP	PA	7/3/2007
EPA 624		Acetonitrile	NELAP	PA	7/3/2007
EPA 624		Acrolein (Propenal)	NELAP	PA	1/19/2005
EPA 624		Acrylonitrile	NELAP	PA	1/19/2005
EPA 624		Allyl chloride (3-Chloropropene)	NELAP	PA	7/3/2007
EPA 624		Benzene	NELAP	PA	1/19/2005
EPA 624		Bromobenzene	NELAP	PA	7/3/2007
EPA 624		Bromochloromethane	NELAP	PA	5/2/2006
EPA 624		Bromodichloromethane	NELAP	PA	1/19/2005
EPA 624		Bromoform	NELAP	PA	1/19/2005
EPA 624		Carbon disulfide	NELAP	PA	7/3/2007
EPA 624		Carbon tetrachloride	NELAP	PA	1/19/2005
EPA 624		Chlorobenzene	NELAP	PA	1/19/2005
EPA 624		Chloroethane	NELAP	PA	1/19/2005
EPA 624		Chloroform	NELAP	PA	1/19/2005

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 624		Chloroprene (2-Chloro-1,3-butadiene)	NELAP	PA	6/12/2009
EPA 624		Cyclohexane	NELAP	PA	7/3/2007
EPA 624		Dibromochloromethane	NELAP	PA	4/4/2005
EPA 624		Dibromomethane	NELAP	PA	7/3/2007
EPA 624		Dichlorodifluoromethane (Freon 12)	NELAP	PA	7/3/2007
EPA 624		Diisopropyl ether (DIPE)	NELAP	PA	5/2/2006
EPA 624		Ethyl acetate	NELAP	PA	1/20/2012
EPA 624		Ethyl methacrylate	NELAP	PA	7/3/2007
EPA 624		Ethylbenzene	NELAP	PA	1/19/2005
EPA 624		Freon 113 (1,1,2-Trichloro-1,2,2-trifluoroethane)	NELAP	PA	2/1/2011
EPA 624		Freon-123A	NELAP	PA	2/1/2011
EPA 624		Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	7/3/2007
EPA 624		Isopropylbenzene (Cumene)	NELAP	PA	5/2/2006
EPA 624		Methacrylonitrile	NELAP	PA	7/3/2007
EPA 624		Methyl bromide (Bromomethane)	NELAP	PA	1/19/2005
EPA 624		Methyl chloride (Chloromethane)	NELAP	PA	1/19/2005
EPA 624		Methyl iodide (Iodomethane)	NELAP	PA	7/3/2007
EPA 624		Methyl tert-butyl ether (MTBE)	NELAP	PA	12/12/2005
EPA 624		Methylene chloride (Dichloromethane)	NELAP	PA	1/19/2005
EPA 624		Methylmethacrylate	NELAP	PA	7/3/2007
EPA 624		Naphthalene	NELAP	PA	7/3/2007
EPA 624		Pentachloroethane	NELAP	PA	7/3/2007
EPA 624		Propionitrile (Ethyl cyanide)	NELAP	PA	7/3/2007
EPA 624		Styrene	NELAP	PA	5/2/2006
EPA 624		Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	1/19/2005
EPA 624		Tetrahydrofuran (THF)	NELAP	PA	7/3/2007
EPA 624		Toluene	NELAP	PA	1/19/2005
EPA 624		Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	1/19/2005
EPA 624		Trichlorofluoromethane (Freon 11)	NELAP	PA	1/19/2005
EPA 624		Vinyl acetate	NELAP	PA	7/3/2007
EPA 624		Vinyl chloride (Chloroethene)	NELAP	PA	1/19/2005
EPA 624		Xylenes, total	NELAP	PA	1/19/2005
EPA 624		cis-1,2-Dichloroethene	NELAP	PA	6/12/2009
EPA 624		cis-1,3-Dichloropropene	NELAP	PA	1/19/2005
EPA 624		n-Butylbenzene	NELAP	PA	7/3/2007
EPA 624		n-Heptane	NELAP	PA	7/3/2007
EPA 624		n-Hexane	NELAP	PA	7/3/2007
EPA 624		n-Propylbenzene	NELAP	PA	7/3/2007
EPA 624		p-Isopropyltoluene (4-Isopropyltoluene)	NELAP	PA	7/3/2007
EPA 624		sec-Butylbenzene	NELAP	PA	7/3/2007
EPA 624		tert-Amyl methyl ether (TAME)	NELAP	PA	5/2/2006
EPA 624		tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	5/2/2006
EPA 624		tert-Butyl ethyl ether	NELAP	PA	5/2/2006
EPA 624		tert-Butylbenzene	NELAP	PA	7/3/2007
EPA 624		trans-1,2-Dichloroethene	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 624		trans-1,3-Dichloropropene	NELAP	PA	1/19/2005
EPA 625		1,1'-Biphenyl (Biphenyl, Lemonene)	NELAP	PA	7/3/2007
EPA 625		1,2,4,5-Tetrachlorobenzene	NELAP	PA	5/2/2006
EPA 625		1,2,4-Trichlorobenzene	NELAP	PA	1/19/2005
EPA 625		1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 625		1,2-Diphenylhydrazine	NELAP	PA	5/2/2006
EPA 625		1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 625		1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 625		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	7/3/2007
EPA 625		1-Methylphenanthrene	NELAP	PA	5/2/2006
EPA 625		2,3,4,6-Tetrachlorophenol	NELAP	PA	7/3/2007
EPA 625		2,3-Dichloroaniline	NELAP	PA	5/2/2006
EPA 625		2,3-Dinitrotoluene	NELAP	PA	7/3/2007
EPA 625		2,4,5-Trichlorophenol	NELAP	PA	7/3/2007
EPA 625		2,4,6-Trichlorophenol	NELAP	PA	1/19/2005
EPA 625		2,4-Dichlorophenol	NELAP	PA	1/19/2005
EPA 625		2,4-Dimethylphenol	NELAP	PA	1/19/2005
EPA 625		2,4-Dinitrophenol	NELAP	PA	1/19/2005
EPA 625		2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	1/19/2005
EPA 625		2,6-Dichlorophenol	NELAP	PA	7/3/2007
EPA 625		2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	1/19/2005
EPA 625		2-Chloronaphthalene	NELAP	PA	1/19/2005
EPA 625		2-Chlorophenol	NELAP	PA	1/19/2005
EPA 625		2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NELAP	PA	1/19/2005
EPA 625		2-Methylnaphthalene	NELAP	PA	7/3/2007
EPA 625		2-Methylphenol (o-Cresol)	NELAP	PA	7/3/2007
EPA 625		2-Nitroaniline	NELAP	PA	7/3/2007
EPA 625		2-Nitrophenol	NELAP	PA	1/19/2005
EPA 625		3+4-Methylphenol (m+p-Cresol)	NELAP	PA	7/3/2007
EPA 625		3,3'-Dichlorobenzidine	NELAP	PA	1/19/2005
EPA 625		3-Nitroaniline	NELAP	PA	7/3/2007
EPA 625		4-Bromophenyl phenyl ether	NELAP	PA	1/19/2005
EPA 625		4-Chloro-3-methylphenol	NELAP	PA	1/19/2005
EPA 625		4-Chloroaniline	NELAP	PA	7/3/2007
EPA 625		4-Chlorophenyl phenyl ether	NELAP	PA	1/19/2005
EPA 625		4-Nitroaniline	NELAP	PA	7/3/2007
EPA 625		4-Nitrophenol	NELAP	PA	1/19/2005
EPA 625		Acenaphthene	NELAP	PA	1/19/2005
EPA 625		Acenaphthylene	NELAP	PA	1/19/2005
EPA 625		Acetophenone	NELAP	PA	5/2/2006
EPA 625		Aniline	NELAP	PA	5/2/2006
EPA 625		Anthracene	NELAP	PA	4/4/2005
EPA 625		Benzidine	NELAP	PA	1/19/2005
EPA 625		Benzo[a]anthracene	NELAP	PA	1/19/2005
EPA 625		Benzo[a]pyrene	NELAP	PA	1/19/2005

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 625		Benzo[b]fluoranthene	NELAP	PA	1/19/2005
EPA 625		Benzo[ghi]perylene	NELAP	PA	1/19/2005
EPA 625		Benzo[k]fluoranthene	NELAP	PA	1/19/2005
EPA 625		Benzoic acid	NELAP	PA	5/2/2006
EPA 625		Benzyl alcohol	NELAP	PA	7/3/2007
EPA 625		Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	1/19/2005
EPA 625		Carbazole	NELAP	PA	5/2/2006
EPA 625		Chrysene (Benzo[a]phenanthrene)	NELAP	PA	1/19/2005
EPA 625		Di-n-butyl phthalate	NELAP	PA	1/19/2005
EPA 625		Di-n-octyl phthalate	NELAP	PA	1/19/2005
EPA 625		Dibenzo[a,h]anthracene	NELAP	PA	1/19/2005
EPA 625		Dibenzofuran	NELAP	PA	7/3/2007
EPA 625		Diethyl phthalate	NELAP	PA	1/19/2005
EPA 625		Dimethyl phthalate	NELAP	PA	1/19/2005
EPA 625		Diphenyl ether	NELAP	PA	7/3/2007
EPA 625		Fluoranthene	NELAP	PA	1/19/2005
EPA 625		Fluorene	NELAP	PA	1/19/2005
EPA 625		Hexachlorobenzene	NELAP	PA	1/19/2005
EPA 625		Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	1/19/2005
EPA 625		Hexachlorocyclopentadiene	NELAP	PA	1/19/2005
EPA 625		Hexachloroethane	NELAP	PA	1/19/2005
EPA 625		Indeno(1,2,3-cd)pyrene	NELAP	PA	1/19/2005
EPA 625		Isophorone	NELAP	PA	1/19/2005
EPA 625		N-Nitrosodi-n-butylamine	NELAP	PA	5/2/2006
EPA 625		N-Nitrosodi-n-propylamine	NELAP	PA	1/19/2005
EPA 625		N-Nitrosodiethylamine	NELAP	PA	5/2/2006
EPA 625		N-Nitrosodimethylamine	NELAP	PA	1/19/2005
EPA 625		N-Nitrosodiphenylamine	NELAP	PA	1/19/2005
EPA 625		N-Nitrosopyrrolidine	NELAP	PA	5/2/2006
EPA 625		Naphthalene	NELAP	PA	1/19/2005
EPA 625		Nitrobenzene	NELAP	PA	1/19/2005
EPA 625		Pentachlorobenzene	NELAP	PA	7/3/2007
EPA 625		Pentachlorophenol (PCP)	NELAP	PA	1/19/2005
EPA 625		Phenanthrene	NELAP	PA	1/19/2005
EPA 625		Phenol	NELAP	PA	1/19/2005
EPA 625		Pyrene	NELAP	PA	1/19/2005
EPA 625		Pyridine	NELAP	PA	5/2/2006
EPA 625		alpha-Terpineol	NELAP	PA	5/2/2006
EPA 625		bis(2-Chloroethoxy)methane	NELAP	PA	1/19/2005
EPA 625		bis(2-Chloroethyl) ether	NELAP	PA	1/19/2005
EPA 625		bis(2-Chloroisopropyl) ether	NELAP	PA	1/19/2005
EPA 625		bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	1/19/2005
EPA 625		n-Decane	NELAP	PA	5/2/2006
EPA 625		n-Docosane	NELAP	PA	5/2/2006

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 625		n-Dodecane	NELAP	PA	5/2/2006
EPA 625		n-Eicosane	NELAP	PA	5/2/2006
EPA 625		n-Hexadecane	NELAP	PA	5/2/2006
EPA 625		n-Octadecane	NELAP	PA	5/2/2006
EPA 625		n-Tetradecane	NELAP	PA	5/2/2006
EPA 625		o-Toluidine (2-Toluidine, 2-Methylaniline)	NELAP	PA	7/3/2007
EPA 6850		Perchlorate	NELAP	PA	1/19/2011
EPA 7196	A	Chromium VI	NELAP	PA	4/6/2006
EPA 7199		Chromium VI	NELAP	PA	1/4/2006
EPA 7470		Mercury	NELAP	PA	11/21/2005
EPA 8011		1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	5/2/2006
EPA 8011		1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	12/12/2005
EPA 8015		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
EPA 8015		Diethylene glycol	NELAP	PA	1/20/2012
EPA 8015		Ethane	NELAP	PA	12/4/2007
EPA 8015		Ethanol	NELAP	PA	12/4/2007
EPA 8015		Ethene	NELAP	PA	12/4/2007
EPA 8015		Ethylene glycol	NELAP	PA	12/4/2007
EPA 8015		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
EPA 8015		Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	2/7/2012
EPA 8015		Isopropyl alcohol (2-Propanol)	NELAP	PA	12/4/2007
EPA 8015		Methane	NELAP	PA	12/4/2007
EPA 8015		Methanol	NELAP	PA	12/4/2007
EPA 8015	C	Nonhalogenated organics by GC/FID	NELAP	PA	3/26/2012
EPA 8015	B	Nonhalogenated organics by GC/FID	NELAP	PA	3/26/2012
EPA 8015	D	Nonhalogenated organics by GC/FID	NELAP	PA	7/29/2015
EPA 8015		Propane	NELAP	PA	12/4/2007
EPA 8015		Propylene glycol	NELAP	PA	1/20/2012
EPA 8015		Tetraethylene glycol	NELAP	PA	1/20/2012
EPA 8015		Total petroleum hydrocarbons (TPH)	NELAP	PA	1/24/2007
EPA 8015		Triethylene glycol	NELAP	PA	1/20/2012
EPA 8015		n-Butyl alcohol (n-Butanol, 1-Butanol)	NELAP	PA	2/7/2012
EPA 8015		n-Propanol (1-Propanol)	NELAP	PA	2/7/2012
EPA 8021		Benzene	NELAP	PA	12/12/2005
EPA 8021		Ethylbenzene	NELAP	PA	12/12/2005
EPA 8021		Isopropylbenzene (Cumene)	NELAP	PA	12/12/2005
EPA 8021		Methyl tert-butyl ether (MTBE)	NELAP	PA	2/11/2011
EPA 8021		Napbthalene	NELAP	PA	6/24/2008
EPA 8021		Toluene	NELAP	PA	12/12/2005
EPA 8021	B	VOCs by GC/PID/ELCD	NELAP	PA	3/26/2012
EPA 8021		Xylenes, total	NELAP	PA	12/12/2005
EPA 8021		m-Xylene	NELAP	PA	11/23/2009
EPA 8021		o-Xylene	NELAP	PA	11/23/2009
EPA 8021		p-Xylene	NELAP	PA	11/23/2009

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8081		4,4'-DDD	NELAP	PA	2/10/2006
EPA 8081		4,4'-DDE	NELAP	PA	12/12/2005
EPA 8081		4,4'-DDT	NELAP	PA	12/12/2005
EPA 8081		Aldrin (HHDN)	NELAP	PA	12/12/2005
EPA 8081		Chlordane (tech.)	NELAP	PA	12/12/2005
EPA 8081		Dieldrin	NELAP	PA	12/12/2005
EPA 8081		Endosulfan I	NELAP	PA	2/10/2006
EPA 8081		Endosulfan II	NELAP	PA	12/12/2005
EPA 8081		Endosulfan sulfate	NELAP	PA	12/12/2005
EPA 8081		Endrin	NELAP	PA	12/12/2005
EPA 8081		Endrin aldehyde	NELAP	PA	12/12/2005
EPA 8081		Endrin ketone	NELAP	PA	2/10/2006
EPA 8081		Heptachlor	NELAP	PA	12/12/2005
EPA 8081		Heptachlor epoxide	NELAP	PA	12/12/2005
EPA 8081		Kepone	NELAP	PA	5/2/2006
EPA 8081		Methoxychlor	NELAP	PA	12/12/2005
EPA 8081		Mirex	NELAP	PA	12/12/2005
EPA 8081	A	Organochlorine pesticides by GC/ECD	NELAP	PA	3/26/2012
EPA 8081	B	Organochlorine pesticides by GC/ECD	NELAP	PA	1/1/2013
EPA 8081		Toxaphene (Chlorinated camphene)	NELAP	PA	12/12/2005
EPA 8081		alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	2/10/2006
EPA 8081		alpha-Chlordane	NELAP	PA	2/10/2006
EPA 8081		beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	2/10/2006
EPA 8081		delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	2/10/2006
EPA 8081		gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	2/10/2006
EPA 8081		gamma-Chlordane	NELAP	PA	2/10/2006
EPA 8082		Aroclor-1016 (PCB-1016)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1221 (PCB-1221)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1232 (PCB-1232)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1242 (PCB-1242)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1248 (PCB-1248)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1254 (PCB-1254)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1260 (PCB-1260)	NELAP	PA	12/11/2006
EPA 8082		Aroclor-1262 (PCB-1262)	NELAP	PA	7/23/2008
EPA 8082		Aroclor-1268 (PCB-1268)	NELAP	PA	7/23/2008
EPA 8082		Decachlorobiphenyl	NELAP	PA	12/17/2012
EPA 8082	A	PCBs by GC/ECD	NELAP	PA	3/26/2012
EPA 8141		Alachlor (Lasso)	NELAP	PA	1/21/2009
EPA 8141		Atrazine	NELAP	PA	12/12/2005
EPA 8141		Azinphos-methyl (Guthion)	NELAP	PA	12/12/2005
EPA 8141		Bolstar (Sulprofos)	NELAP	PA	12/12/2005
EPA 8141		Carbophenothion (Trithion)	NELAP	PA	11/9/2012
EPA 8141		Chlorpyrifos	NELAP	PA	12/12/2005
EPA 8141		Coumaphos	NELAP	PA	12/12/2005
EPA 8141		Demeton-O	NELAP	PA	12/12/2005

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8141		Demeton-S	NELAP	PA	12/12/2005
EPA 8141		Diazinon (Spectracide)	NELAP	PA	12/12/2005
EPA 8141		Dichlorovos (DDVP, Dichlorvos)	NELAP	PA	12/12/2005
EPA 8141		Disulfoton	NELAP	PA	12/12/2005
EPA 8141		EPN (Santox)	NELAP	PA	12/12/2005
EPA 8141		Ethion	NELAP	PA	12/12/2005
EPA 8141		Ethoprop (Prophos)	NELAP	PA	12/12/2005
EPA 8141		Famphur	NELAP	PA	12/12/2005
EPA 8141		Fensulfothion	NELAP	PA	12/12/2005
EPA 8141		Fenthion	NELAP	PA	12/12/2005
EPA 8141		Malathion	NELAP	PA	12/12/2005
EPA 8141		Merphos	NELAP	PA	12/12/2005
EPA 8141		Methyl parathion (Parathion, methyl)	NELAP	PA	12/12/2005
EPA 8141		Metolachlor	NELAP	PA	1/24/2007
EPA 8141		Mevinphos	NELAP	PA	12/12/2005
EPA 8141		Naled	NELAP	PA	12/12/2005
EPA 8141	B	Organophosphorus compounds by GC/NPD	NELAP	PA	3/26/2012
EPA 8141	A	Organophosphorus compounds by GC/NPD	NELAP	PA	3/26/2012
EPA 8141		Parathion, ethyl (Ethyl parathion, Parathion)	NELAP	PA	12/12/2005
EPA 8141		Phorate (Thimet)	NELAP	PA	12/12/2005
EPA 8141		Ronnel	NELAP	PA	12/12/2005
EPA 8141		Simazine	NELAP	PA	12/12/2005
EPA 8141		Stirophos (Tetrachlorovinphos)	NELAP	PA	5/2/2006
EPA 8141		Tokuthion (Prothiophos)	NELAP	PA	12/12/2005
EPA 8141		Trichloronate	NELAP	PA	5/2/2006
EPA 8151		2,4,5-T	NELAP	PA	12/12/2005
EPA 8151		2,4,5-TP (Silvex)	NELAP	PA	12/12/2005
EPA 8151		2,4-D	NELAP	PA	12/12/2005
EPA 8151		2,4-DB (Butoxon)	NELAP	PA	12/12/2005
EPA 8151	A	Chlorinated herbicides by GC/ECD	NELAP	PA	3/26/2012
EPA 8151		Dalapon (2,2-Dichloropropionic acid)	NELAP	PA	12/12/2005
EPA 8151		Dicamba	NELAP	PA	12/12/2005
EPA 8151		Dichloroprop (Dichlorprop)	NELAP	PA	1/24/2007
EPA 8151		Dinoseb (2-sec-Butyl-4,6-dinitrophenol, DNBP)	NELAP	PA	12/12/2005
EPA 8151		MCPA	NELAP	PA	12/12/2005
EPA 8151		MCPP (Mecoprop)	NELAP	PA	12/12/2005
EPA 8151		Pentachlorophenol (PCP)	NELAP	PA	12/12/2005
EPA 8151		Picloram (4-Amino-3,5,6-trichloro-2-pyridinecarboxylic acid)	NELAP	PA	12/12/2005
EPA 8260		1,1,1,2-Tetrachloroethane	NELAP	PA	12/12/2005
EPA 8260		1,1,1-Trichloroethane	NELAP	PA	12/12/2005
EPA 8260		1,1,2,2-Tetrachloroethane	NELAP	PA	12/12/2005
EPA 8260		1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NELAP	PA	12/12/2005
EPA 8260		1,1,2-Trichloroethane	NELAP	PA	12/12/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260		1,1-Dichloroethane	NELAP	PA	12/12/2005
EPA 8260		1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	12/12/2005
EPA 8260		1,1-Dichloropropene	NELAP	PA	12/12/2005
EPA 8260		1,2,3-Trichlorobenzene	NELAP	PA	12/12/2005
EPA 8260		1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	12/12/2005
EPA 8260		1,2,4-Trichlorobenzene	NELAP	PA	12/12/2005
EPA 8260		1,2,4-Trimethylbenzene	NELAP	PA	12/12/2005
EPA 8260		1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	12/12/2005
EPA 8260		1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	12/12/2005
EPA 8260		1,2-Dichloro-1,1,2-trifluoroethane	NELAP	PA	3/19/2015
EPA 8260		1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	12/12/2005
EPA 8260		1,2-Dichloroethane	NELAP	PA	12/12/2005
EPA 8260		1,2-Dichloropropane	NELAP	PA	12/12/2005
EPA 8260		1,3,5-Trimethylbenzene	NELAP	PA	12/12/2005
EPA 8260		1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	12/12/2005
EPA 8260		1,3-Dichloropropane	NELAP	PA	12/12/2005
EPA 8260		1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	12/12/2005
EPA 8260		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	12/12/2005
EPA 8260		2,2-Dichloropropane	NELAP	PA	5/2/2006
EPA 8260		2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	5/2/2006
EPA 8260		2-Chloroethyl vinyl ether	NELAP	PA	12/12/2005
EPA 8260		2-Chlorotoluene	NELAP	PA	12/12/2005
EPA 8260		2-Hexanone	NELAP	PA	12/12/2005
EPA 8260		2-Nitropropane	NELAP	PA	1/19/2011
EPA 8260		3,3'-Dimethyl-1-butanol	NELAP	PA	4/17/2009
EPA 8260		4-Chlorotoluene	NELAP	PA	12/12/2005
EPA 8260		4-Methyl-2-pentanone (MIBK)	NELAP	PA	12/12/2005
EPA 8260		Acetone	NELAP	PA	12/12/2005
EPA 8260		Acetonitrile	NELAP	PA	12/12/2005
EPA 8260		Acrolein (Propenal)	NELAP	PA	12/12/2005
EPA 8260		Acrylonitrile	NELAP	PA	12/12/2005
EPA 8260		Allyl chloride (3-Chloropropene)	NELAP	PA	12/12/2005
EPA 8260		Benzene	NELAP	PA	12/12/2005
EPA 8260		Benzyl chloride	NELAP	PA	7/3/2007
EPA 8260		Bromobenzene	NELAP	PA	12/12/2005
EPA 8260		Bromochloromethane	NELAP	PA	12/12/2005
EPA 8260		Bromodichloromethane	NELAP	PA	12/12/2005
EPA 8260		Bromoform	NELAP	PA	12/12/2005
EPA 8260		Carbon disulfide	NELAP	PA	12/12/2005
EPA 8260		Carbon tetrachloride	NELAP	PA	12/12/2005
EPA 8260		Chlorobenzene	NELAP	PA	12/12/2005
EPA 8260		Chloroethane	NELAP	PA	12/12/2005
EPA 8260		Chloroform	NELAP	PA	12/12/2005
EPA 8260		Chloroprene (2-Chloro-1,3-butadiene)	NELAP	PA	7/3/2007

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260		Crotonaldehyde	NELAP	PA	10/30/2014
EPA 8260		Cyclohexane	NELAP	PA	7/3/2007
EPA 8260		Cyclohexanone	NELAP	PA	6/7/2012
EPA 8260		Dibromochloromethane	NELAP	PA	12/12/2005
EPA 8260		Dibromomethane	NELAP	PA	5/2/2006
EPA 8260		Dichlorodifluoromethane (Freon 12)	NELAP	PA	12/12/2005
EPA 8260		Diethyl ether (Ethyl ether)	NELAP	PA	2/1/2011
EPA 8260		Diisopropyl ether (DIPE)	NELAP	PA	7/3/2007
EPA 8260		Dimethyl ether	NELAP	PA	6/7/2012
EPA 8260		Epichlorohydrin (1-Chloro-2,3-epoxypropane)	NELAP	PA	4/17/2009
EPA 8260		Ethanol	NELAP	PA	1/24/2007
EPA 8260		Ethyl acetate	NELAP	PA	1/24/2007
EPA 8260		Ethyl methacrylate	NELAP	PA	1/24/2007
EPA 8260		Ethyl tert-butyl ether (ETBE)	NELAP	PA	1/24/2007
EPA 8260		Ethylbenzene	NELAP	PA	12/12/2005
EPA 8260		Ethylene oxide	NELAP	PA	10/30/2014
EPA 8260		Freon 113 (1,1,2-Trichloro-1,2,2-trifluoroethane)	NELAP	PA	3/4/2015
EPA 8260		Gasoline-range organics (GRO)	NELAP	PA	6/8/2006
EPA 8260		Heptane	NELAP	PA	1/20/2012
EPA 8260		Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	12/12/2005
EPA 8260		Hexachloroethane	NELAP	PA	5/23/2012
EPA 8260		Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	7/3/2007
EPA 8260		Isopropyl alcohol (2-Propanol)	NELAP	PA	1/18/2011
EPA 8260		Isopropylbenzene (Cumene)	NELAP	PA	5/2/2006
EPA 8260		Methacrylonitrile	NELAP	PA	7/3/2007
EPA 8260		Methyl acetate	NELAP	PA	1/24/2007
EPA 8260		Methyl bromide (Bromomethane)	NELAP	PA	12/12/2005
EPA 8260		Methyl chloride (Chloromethane)	NELAP	PA	12/12/2005
EPA 8260		Methyl iodide (Iodomethane)	NELAP	PA	5/25/2007
EPA 8260		Methyl tert-butyl ether (MTBE)	NELAP	PA	12/12/2005
EPA 8260		Methylcyclohexane	NELAP	PA	1/21/2009
EPA 8260		Methylene chloride (Dichloromethane)	NELAP	PA	12/12/2005
EPA 8260		Methylmethacrylate	NELAP	PA	5/25/2007
EPA 8260		Naphthalene	NELAP	PA	12/12/2005
EPA 8260		Pentachloroethane	NELAP	PA	1/24/2007
EPA 8260		Propionitrile (Ethyl cyanide)	NELAP	PA	12/12/2005
EPA 8260		Styrene	NELAP	PA	12/12/2005
EPA 8260		Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	12/12/2005
EPA 8260		Tetrahydrofuran (THF)	NELAP	PA	1/18/2011
EPA 8260		Toluene	NELAP	PA	12/12/2005
EPA 8260		Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	12/12/2005
EPA 8260		Trichlorofluoromethane (Freon 11)	NELAP	PA	12/12/2005
EPA 8260	B	VOCs by GC/MS	NELAP	PA	3/26/2012

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260	C	VOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8260		Vinyl acetate	NELAP	PA	12/12/2005
EPA 8260		Vinyl chloride (Chloroethene)	NELAP	PA	12/12/2005
EPA 8260		Xylenes, total	NELAP	PA	12/12/2005
EPA 8260		cis-1,2-Dichloroethene	NELAP	PA	12/12/2005
EPA 8260		cis-1,3-Dichloropropene	NELAP	PA	12/12/2005
EPA 8260		m+p-Xylene	NELAP	PA	4/17/2009
EPA 8260		n-Butyl alcohol (n-Butanol, 1-Butanol)	NELAP	PA	4/17/2009
EPA 8260		n-Butylbenzene	NELAP	PA	12/12/2005
EPA 8260		n-Hexane	NELAP	PA	1/20/2012
EPA 8260		n-Propylamine	NELAP	PA	12/12/2005
EPA 8260		n-Propylbenzene	NELAP	PA	1/24/2007
EPA 8260		o-Xylene	NELAP	PA	4/17/2009
EPA 8260		p-Isopropyltoluene (4-Isopropyltoluene)	NELAP	PA	1/24/2007
EPA 8260		sec-Butylbenzene	NELAP	PA	12/12/2005
EPA 8260		tert-Amyl alcohol (2-Methyl-2-butanol)	NELAP	PA	4/17/2009
EPA 8260		tert-Amyl methyl ether (TAME)	NELAP	PA	1/24/2007
EPA 8260		tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	12/12/2005
EPA 8260		tert-Butyl formate	NELAP	PA	4/17/2009
EPA 8260		tert-Butylbenzene	NELAP	PA	12/12/2005
EPA 8260		trans-1,2-Dichloroethene	NELAP	PA	12/12/2005
EPA 8260		trans-1,3-Dichloropropene	NELAP	PA	12/12/2005
EPA 8260		trans-1,4-Dichloro-2-butene	NELAP	PA	7/3/2007
EPA 8260 SIM		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	12/4/2007
EPA 8270		1,1'-Biphenyl (Biphenyl, Lemonene)	NELAP	PA	4/17/2009
EPA 8270		1,2,3,4-Tetrachlorobenzene	NELAP	PA	7/3/2007
EPA 8270		1,2,3,4-Tetrahydronaphthalene	NELAP	PA	4/17/2009
EPA 8270		1,2,3,5-Tetrachlorobenzene	NELAP	PA	7/3/2007
EPA 8270		1,2,4,5-Tetrachlorobenzene	NELAP	PA	12/12/2005
EPA 8270		1,2,4-Trichlorobenzene	NELAP	PA	12/12/2005
EPA 8270		1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	12/12/2005
EPA 8270		1,2-Diphenylhydrazine	NELAP	PA	12/12/2005
EPA 8270		1,3,5-Trinitrobenzene (1,3,5-TNB)	NELAP	PA	12/12/2005
EPA 8270		1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	12/12/2005
EPA 8270		1,3-Dinitrobenzene (1,3-DNB)	NELAP	PA	12/12/2005
EPA 8270		1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	12/12/2005
EPA 8270		1,4-Dinitrobenzene (1,4-DNB)	NELAP	PA	4/17/2009
EPA 8270		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	4/17/2009
EPA 8270		1,4-Naphthoquinone	NELAP	PA	12/12/2005
EPA 8270		1,4-Phenylenediamine	NELAP	PA	12/12/2005
EPA 8270		1-Chloronaphthalene	NELAP	PA	12/12/2005
EPA 8270		1-Methylnaphthalene	NELAP	PA	4/17/2009
EPA 8270		1-Naphthylamine (alpha-Naphthylamine)	NELAP	PA	12/12/2005
EPA 8270		2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl) ether)	NELAP	PA	1/19/2011
EPA 8270		2,3,4,6-Tetrachlorophenol	NELAP	PA	12/12/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		2,4,5-Trichlorophenol	NELAP	PA	12/12/2005
EPA 8270		2,4,6-Trichlorophenol	NELAP	PA	12/12/2005
EPA 8270		2,4-Dichlorophenol	NELAP	PA	12/12/2005
EPA 8270		2,4-Dimethylphenol	NELAP	PA	12/12/2005
EPA 8270		2,4-Dinitrophenol	NELAP	PA	12/12/2005
EPA 8270		2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	12/12/2005
EPA 8270		2,6-Dichlorophenol	NELAP	PA	12/12/2005
EPA 8270		2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	12/12/2005
EPA 8270		2-Acetylaminofluorene	NELAP	PA	12/12/2005
EPA 8270		2-Butoxyethanol	NELAP	PA	2/7/2012
EPA 8270		2-Chloronaphthalene	NELAP	PA	12/12/2005
EPA 8270		2-Chlorophenol	NELAP	PA	12/12/2005
EPA 8270		2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NELAP	PA	12/12/2005
EPA 8270		2-Methylnaphthalene	NELAP	PA	12/12/2005
EPA 8270		2-Methylphenol (o-Cresol)	NELAP	PA	12/12/2005
EPA 8270		2-Naphthylamine (beta-Naphthylamine)	NELAP	PA	12/12/2005
EPA 8270		2-Nitroaniline	NELAP	PA	12/12/2005
EPA 8270		2-Nitrophenol	NELAP	PA	12/12/2005
EPA 8270		2-Picoline (2-Methylpyridine)	NELAP	PA	5/2/2006
EPA 8270		3+4-Methylphenol (m+p-Cresol)	NELAP	PA	12/12/2005
EPA 8270		3,3'-Dichlorobenzidine	NELAP	PA	12/12/2005
EPA 8270		3,3'-Dimethylbenzidine	NELAP	PA	7/3/2007
EPA 8270		3-Methylcholanthrene	NELAP	PA	12/12/2005
EPA 8270		3-Nitroaniline	NELAP	PA	12/12/2005
EPA 8270		4,4'-Methylenebis(2-chloroaniline)	NELAP	PA	12/12/2005
EPA 8270		4-Aminobiphenyl	NELAP	PA	12/12/2005
EPA 8270		4-Bromophenyl phenyl ether	NELAP	PA	12/12/2005
EPA 8270		4-Chloro-3-methylphenol	NELAP	PA	12/12/2005
EPA 8270		4-Chloroaniline	NELAP	PA	12/12/2005
EPA 8270		4-Chlorophenyl phenyl ether	NELAP	PA	12/12/2005
EPA 8270		4-Nitroaniline	NELAP	PA	12/12/2005
EPA 8270		4-Nitrophenol	NELAP	PA	12/12/2005
EPA 8270		4-Nitroquinoline-1-oxide	NELAP	PA	7/3/2007
EPA 8270		5-Nitro-o-toluidine	NELAP	PA	12/12/2005
EPA 8270		6-Methylchrysene	NELAP	PA	1/19/2011
EPA 8270		7,12-Dimethylbenz(a)anthracene	NELAP	PA	12/12/2005
EPA 8270		Acenaphthene	NELAP	PA	12/12/2005
EPA 8270		Acenaphthylene	NELAP	PA	12/12/2005
EPA 8270		Acetophenone	NELAP	PA	12/12/2005
EPA 8270		Aniline	NELAP	PA	12/12/2005
EPA 8270		Anthracene	NELAP	PA	12/12/2005
EPA 8270		Aramite	NELAP	PA	12/12/2005
EPA 8270		Atrazine	NELAP	PA	1/22/2007
EPA 8270		Benzaldehyde	NELAP	PA	4/17/2009
EPA 8270		Benzenethiol	NELAP	PA	4/17/2009

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		Benzidine	NELAP	PA	12/12/2005
EPA 8270		Benzo[a]anthracene	NELAP	PA	12/12/2005
EPA 8270		Benzo[a]pyrene	NELAP	PA	12/12/2005
EPA 8270		Benzo[b]fluoranthene	NELAP	PA	12/12/2005
EPA 8270		Benzo[ghi]perylene	NELAP	PA	12/12/2005
EPA 8270		Benzo[k]fluoranthene	NELAP	PA	12/12/2005
EPA 8270		Benzoic acid	NELAP	PA	12/12/2005
EPA 8270		Benzyl alcohol	NELAP	PA	12/12/2005
EPA 8270		Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	12/12/2005
EPA 8270		Caprolactam	NELAP	PA	4/17/2009
EPA 8270		Carbazole	NELAP	PA	12/12/2005
EPA 8270		Chlorobenzilate	NELAP	PA	12/12/2005
EPA 8270		Chrysene (Benzo[a]phenanthrene)	NELAP	PA	12/12/2005
EPA 8270		Di-n-butyl phthalate	NELAP	PA	12/12/2005
EPA 8270		Di-n-octyl phthalate	NELAP	PA	12/12/2005
EPA 8270		Diallate (cis or trans)	NELAP	PA	12/12/2005
EPA 8270		Dibenz[a,b]acridine	NELAP	PA	4/17/2009
EPA 8270		Dibenz[a,j]acridine	NELAP	PA	12/12/2005
EPA 8270		Dibenzo[a,h]anthracene	NELAP	PA	12/12/2005
EPA 8270		Dibenzofuran	NELAP	PA	12/12/2005
EPA 8270		Diethyl phthalate	NELAP	PA	12/12/2005
EPA 8270		Dimethoate	NELAP	PA	12/12/2005
EPA 8270		Dimethyl phthalate	NELAP	PA	12/12/2005
EPA 8270		Dimethylaminoazobenzene (4-Dimethylaminoazobenzene)	NELAP	PA	5/2/2006
EPA 8270		Dinoseb (2-sec-Butyl-4,6-dinitrophenol, DNBP)	NELAP	PA	12/12/2005
EPA 8270		Diphenylamine	NELAP	PA	12/12/2005
EPA 8270		Disulfoton	NELAP	PA	12/12/2005
EPA 8270		Ethyl methanesulfonate	NELAP	PA	12/12/2005
EPA 8270		Famphur	NELAP	PA	12/12/2005
EPA 8270		Fluoranthene	NELAP	PA	12/12/2005
EPA 8270		Fluorene	NELAP	PA	12/12/2005
EPA 8270		Hexachlorobenzene	NELAP	PA	12/12/2005
EPA 8270		Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	12/12/2005
EPA 8270		Hexacblorocyclopentadiene	NELAP	PA	12/12/2005
EPA 8270		Hexachloroethane	NELAP	PA	12/12/2005
EPA 8270		Hexachloropropene	NELAP	PA	12/12/2005
EPA 8270		Indene	NELAP	PA	4/17/2009
EPA 8270		Indeno(1,2,3-cd)pyrene	NELAP	PA	12/12/2005
EPA 8270		Isodrin	NELAP	PA	12/12/2005
EPA 8270		Isopborone	NELAP	PA	12/12/2005
EPA 8270		Isosafrole	NELAP	PA	12/12/2005
EPA 8270		Kepone	NELAP	PA	12/12/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		Methapyrilene	NELAP	PA	12/12/2005
EPA 8270		Methyl methanesulfonate	NELAP	PA	12/12/2005
EPA 8270		Methyl parathion (Parathion, methyl)	NELAP	PA	5/25/2007
EPA 8270		N,N-Dimethylacetamide	NELAP	PA	4/17/2009
EPA 8270		N,N-Dimethylformamide	NELAP	PA	4/17/2009
EPA 8270		N-Nitrosodi-n-butylamine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosodi-n-propylamine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosodiethylamine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosodimethylamine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosodiphenylamine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosomethylethylamine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosomorpholine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosopiperidine	NELAP	PA	12/12/2005
EPA 8270		N-Nitrosopyrrolidine	NELAP	PA	12/12/2005
EPA 8270		Naphthalene	NELAP	PA	12/12/2005
EPA 8270		Nitrobenzene	NELAP	PA	12/12/2005
EPA 8270		O,O,O-Triethyl phosphorothioate	NELAP	PA	12/12/2005
EPA 8270		Parathion, ethyl (Ethyl parathion, Parathion)	NELAP	PA	5/25/2007
EPA 8270		Pentachlorobenzene	NELAP	PA	12/12/2005
EPA 8270		Pentachloronitrobenzene (PCNB)	NELAP	PA	12/12/2005
EPA 8270		Pentachlorophenol (PCP)	NELAP	PA	12/12/2005
EPA 8270		Phenacetin	NELAP	PA	12/12/2005
EPA 8270		Phenanthrene	NELAP	PA	12/12/2005
EPA 8270		Phenol	NELAP	PA	12/12/2005
EPA 8270		Phorate (Thimet)	NELAP	PA	12/12/2005
EPA 8270		Phthalic anhydride	NELAP	PA	1/21/2009
EPA 8270		Pronamide (Kerb)	NELAP	PA	12/12/2005
EPA 8270		Pyrene	NELAP	PA	12/12/2005
EPA 8270		Pyridine	NELAP	PA	12/12/2005
EPA 8270		Quinoline	NELAP	PA	4/17/2009
EPA 8270	C	SOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8270	D	SOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8270		Safrole	NELAP	PA	12/12/2005
EPA 8270		Sulfotepp (Tetraethyl dithiopyrophosphate)	NELAP	PA	4/17/2009
EPA 8270		Tetraethyl lead	NELAP	PA	3/7/2012
EPA 8270		Thionazine (Thionazin, Zinophos)	NELAP	PA	12/12/2005
EPA 8270		a,a-Dimethylphenethylamine (Phentermine)	NELAP	PA	12/12/2005
EPA 8270		a-Methylstyrene	NELAP	PA	4/17/2009
EPA 8270		bis(2-Chloroethoxy)methane	NELAP	PA	12/12/2005
EPA 8270		bis(2-Chloroethyl) ether	NELAP	PA	12/12/2005
EPA 8270		bis(2-Chloroisopropyl) ether	NELAP	PA	12/12/2005
EPA 8270		bis(2-Chloromethyl) ether	NELAP	PA	1/21/2009
EPA 8270		bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	12/12/2005
EPA 8270		o-Toluidine (2-Toluidine, 2-Methylaniline)	NELAP	PA	12/12/2005
EPA 8270		p-(Dimethylamino)azobenzene	NELAP	PA	4/17/2009

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		tris-(2,3-Dibromopropyl) phosphate (tris-BP)	NELAP	PA	4/17/2009
EPA 8270 SIM		1-Methylnaphthalene	NELAP	PA	7/25/2011
EPA 8270 SIM		2-Methylnaphthalene	NELAP	PA	5/23/2012
EPA 8270 SIM		Acenaphthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Acenaphthylene	NELAP	PA	12/4/2007
EPA 8270 SIM		Anthracene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[a]anthracene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[a]pyrene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[b]fluoranthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[ghi]perylene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[k]fluoranthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Chrysene (Benzo[a]phenanthrene)	NELAP	PA	12/4/2007
EPA 8270 SIM		Dibenzo[a,h]anthracene	NELAP	PA	12/4/2007
EPA 8270 SIM		Fluoranthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Fluorene	NELAP	PA	12/4/2007
EPA 8270 SIM		Indeno(1,2,3-cd)pyrene	NELAP	PA	12/4/2007
EPA 8270 SIM		Naphthalene	NELAP	PA	12/4/2007
EPA 8270 SIM		Phenanthrene	NELAP	PA	12/4/2007
EPA 8270 SIM		Pyrene	NELAP	PA	12/4/2007
EPA 8290		1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	8/6/2010
EPA 8290		1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	NELAP	PA	6/30/2010
EPA 8290		2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	NELAP	PA	8/6/2010

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8290		2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)(Dioxin)	NELAP	PA	6/30/2010
EPA 8290		2,3,7,8-Tetrachlorodibenzofuran (TCDF)	NELAP	PA	6/30/2010
EPA 8290	A	PCDDs and PCDFs by HRGC-HRMS	NELAP	PA	3/4/2015
EPA 8290		PCDDs and PCDFs by HRGC-HRMS	NELAP	PA	3/26/2012
EPA 8290		Total TCDD	NELAP	PA	6/30/2010
EPA 8290		Total TCDF	NELAP	PA	6/30/2010
EPA 8290		Total heptachlorodibenzo-p-dioxin (HpCDD)	NELAP	PA	6/30/2010
EPA 8290		Total heptachlorodibenzofuran (HpCDF)	NELAP	PA	6/30/2010
EPA 8290		Total hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		Total hexacblorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		Total pentachlorodibenzo-p-dioxin (PeCDD)	NELAP	PA	6/30/2010
EPA 8290		Total pentachlorodibenzofuran (PeCDF)	NELAP	PA	6/30/2010
EPA 8315		2,5-Dimethylbenzaldehyde	NELAP	PA	12/12/2005
EPA 8315		Acetaldehyde	NELAP	PA	12/12/2005
EPA 8315		Benzaldehyde	NELAP	PA	12/12/2005
EPA 8315		Butanal (Butyraldehyde)	NELAP	PA	5/2/2006
EPA 8315	A	Carbonyl compounds by HPLC	NELAP	PA	3/26/2012
EPA 8315		Crotonaldehyde	NELAP	PA	12/12/2005
EPA 8315		Formaldehyde	NELAP	PA	12/12/2005
EPA 8315		Hexanal (Hexaldehyde)	NELAP	PA	1/21/2009
EPA 8315		Isovaleraldehyde	NELAP	PA	12/12/2005
EPA 8315		Pentanal (Valeraldehyde)	NELAP	PA	12/12/2005
EPA 8315		Propanal (Propionaldehyde)	NELAP	PA	1/21/2009
EPA 8315		m-Tolualdehyde (1,3-Tolualdehyde)	NELAP	PA	5/2/2006
EPA 8315		o-Tolualdehyde (1,2-Tolualdehyde)	NELAP	PA	1/24/2007
EPA 8315		p-Tolualdehyde (1,4-Tolualdehyde)	NELAP	PA	1/24/2007
EPA 8330		1,3,5-Trinitrobenzene (1,3,5-TNB)	NELAP	PA	12/12/2005
EPA 8330		1,3-Dinitrobenzene (1,3-DNB)	NELAP	PA	12/12/2005
EPA 8330		2,4,6-Trinitrotoluene (2,4,6-TNT)	NELAP	PA	12/12/2005
EPA 8330		2,4-Diamino-6-nitrotoluene	NELAP	PA	7/29/2015
EPA 8330		2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	6/11/2007
EPA 8330		2,6-Diamino-4-nitrotoluene	NELAP	PA	7/29/2015
EPA 8330		2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	6/11/2007
EPA 8330		2-Amino-4,6-dinitrotoluene (2-Am-DNT)	NELAP	PA	12/12/2005
EPA 8330		2-Nitrotoluene	NELAP	PA	12/12/2005
EPA 8330		3,5-Dinitroaniline	NELAP	PA	7/29/2015
EPA 8330		3-Nitrotoluene	NELAP	PA	12/12/2005
EPA 8330		4-Amino-2,6-dinitrotoluene (4-Am-DNT)	NELAP	PA	12/12/2005
EPA 8330		4-Nitrotoluene	NELAP	PA	12/12/2005
EPA 8330		Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NELAP	PA	12/12/2005
EPA 8330		Nitroaromatics and nitramines by HPLC/UV	NELAP	PA	3/26/2012
EPA 8330	B	Nitroaromatics and nitramines by HPLC/UV	NELAP	PA	7/29/2015
EPA 8330	A	Nitroaromatics and nitramines by HPLC/UV	NELAP	PA	3/26/2012

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300

PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8330		Nitrobenzene	NELAP	PA	6/11/2007
EPA 8330		Nitroglycerin	NELAP	PA	1/24/2007
EPA 8330		Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	NELAP	PA	12/12/2005
EPA 8330		Pentaerythritol tetranitrate (PETN)	NELAP	PA	5/2/2006
EPA 8330		RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	NELAP	PA	12/12/2005
EPA 9012		Total cyanide	NELAP	PA	12/12/2005
EPA 9040		pH	NELAP	PA	12/12/2005
EPA 9050	A	Conductivity	NELAP	PA	1/27/2014
EPA 9050		Conductivity	NELAP	PA	12/12/2005
EPA 9056	A	Anions by IC	NELAP	PA	3/19/2015
EPA 9056		Bromide	NELAP	PA	12/12/2005
EPA 9056		Chloride	NELAP	PA	12/12/2005
EPA 9056		Fluoride	NELAP	PA	12/12/2005
EPA 9056		Nitrate as N	NELAP	PA	12/12/2005
EPA 9056		Nitrite as N	NELAP	PA	1/19/2005
EPA 9056		Sulfate	NELAP	PA	12/12/2005
EPA 9060		Total organic carbon (TOC)	NELAP	PA	12/12/2005
EPA 9066		Total phenolics	NELAP	PA	12/12/2005
FL-PRO		Total petroleum hydrocarbons (TPH)	NELAP	PA	12/12/2005
MA DEP EPH	1.1	C11-C22 Aromatics	NELAP	PA	7/15/2013
MA DEP EPH	1.1	C19-C36 Aliphatics	NELAP	PA	7/15/2013
MA DEP EPH	1.1	C9-C18 Aliphatics	NELAP	PA	7/15/2013
MA DEP VPH	1.1	C5-C8 Aliphatics	NELAP	PA	7/15/2013
MA DEP VPH	1.1	C9-C10 Aromatics	NELAP	PA	7/29/2015
MA DEP VPH	1.1	C9-C12 Aliphatics	NELAP	PA	7/15/2013
NWTPH-Dx		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
NWTPH-Gx		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
OIA 1677		Available cyanide	NELAP	PA	10/9/2013
OIA 1677		Free cyanide	NELAP	PA	10/9/2013
RSK-175		Acetylene (Ethyne)	NELAP	PA	1/20/2012
RSK-175		Ethane	NELAP	PA	6/29/2010
RSK-175		Ethene	NELAP	PA	6/29/2010
RSK-175		Methane	NELAP	PA	6/29/2010
RSK-175		Propane	NELAP	PA	6/29/2010
RSK-175		n-Butane	NELAP	PA	12/22/2011
SM 2120 B		Color	NELAP	PA	4/17/2007
SM 2310 B		Acidity as CaCO3	NELAP	PA	4/17/2007
SM 2320 B		Alkalinity as CaCO3	NELAP	PA	1/19/2005
SM 2340 C		Total hardness as CaCO3	NELAP	PA	4/17/2007
SM 2510 B		Conductivity	NELAP	PA	12/12/2005
SM 2540 B		Residue, total	NELAP	PA	4/17/2007
SM 2540 C		Residue, filterable (TDS)	NELAP	PA	4/17/2007
SM 2540 D		Residue, nonfilterable (TSS)	NELAP	PA	4/17/2007
SM 2540 F		Residue, settleable	NELAP	PA	4/17/2007

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Non-Potable Water

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
SM 2580B		Oxidation-reduction potential	NELAP	PA	3/4/2015
SM 3500-Cr B	20-22	Chromium VI	NELAP	PA	5/24/2007
SM 3500-Fe B	20/21	Ferrous iron	NELAP	PA	6/15/2009
SM 4500-CN- G		Amenable cyanide	NELAP	PA	5/24/2007
SM 4500-Cl F		Total residual chlorine	NELAP	PA	1/11/2012
SM 4500-Cl- C		Chloride	NELAP	PA	4/17/2007
SM 4500-F- B		Preliminary distillation of fluoride	NELAP	PA	4/28/2010
SM 4500-F- C		Flnoride	NELAP	PA	1/19/2005
SM 4500-H+ B		pH	NELAP	PA	4/17/2007
SM 4500-NH3 B		Ammonia distillation	NELAP	PA	4/17/2007
SM 4500-NH3 C		Ammonia as N	NELAP	PA	4/17/2007
SM 4500-NH3 D		Ammonia as N	NELAP	PA	4/17/2007
SM 4500-O G		Oxygen (dissolved)	NELAP	PA	4/17/2007
SM 4500-P B		Phosphorus, total	NELAP	PA	4/28/2010
SM 4500-P E		Orthophosphate as P	NELAP	PA	12/12/2005
SM 4500-P F		Phosphorus, total	NELAP	PA	4/28/2010
SM 4500-S D		Sulfide	NELAP	PA	4/17/2007
SM 4500-S F		Sulfide	NELAP	PA	4/17/2007
SM 4500-SO3 B		Sulfite, SO3	NELAP	PA	4/17/2007
SM 4500-SiO2 C	20-22	Silica, as SiO2	NELAP	PA	5/25/2007
SM 4500-SiO2 C	20-22	Silica, dissolved	NELAP	PA	5/24/2007
SM 5210 B		Biochemical oxygen demand (BOD)	NELAP	PA	4/4/2005
SM 5210 B		Carbonaceous BOD (CBOD)	NELAP	PA	1/19/2005
SM 5310 C		Total organic carbon (TOC)	NELAP	PA	5/24/2007
SM 5540 C		Surfactants as MBAS	NELAP	PA	4/17/2007
SM 9222 D		Fecal coliform (Enumeration)	NELAP	PA	7/6/2007
TX1005 (TNRCC)		Total petroleum hydrocarbons (TPH)	NELAP	PA	12/12/2005
TX1006 (TNRCC)		Total petroleum hydrocarbons (TPH)	NELAP	PA	12/12/2005
WA-EPH		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
WA-VPH		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
WI-DRO		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
WI-GRO		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
AK-101		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
AK-102		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
AK-103		Residual-range organics (RRO)	NELAP	PA	3/19/2015
EPA 1010		Ignitability	NELAP	PA	1/19/2005
EPA 1311		Toxicity characteristic leaching procedure (TCLP)	NELAP	PA	12/12/2005
EPA 1312		Synthetic precipitation leaching procedure (SPLP)	NELAP	PA	12/12/2005

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ 206)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ 194)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ 196)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ 207)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ 195)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ 170)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',6,6'-Octachlorobiphenyl (BZ 197)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ 171)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,4'-Hexachlorobiphenyl (BZ 128)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ 177)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ 201)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ 175)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5'-Hexachlorobiphenyl (BZ 130)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ 199)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ 208)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5',6-Octachlorobiphenyl (BZ 198)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ 172)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ 174)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ 200)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ 173)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,5-Hexachlorobiphenyl (BZ 129)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,6'-Hexachlorobiphenyl (BZ 132)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ 176)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4,6-Hexachlorobiphenyl (BZ 131)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',4-Pentachlorobiphenyl (BZ 82)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ 202)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ 178)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,5'-Hexachlorobiphenyl (BZ 133)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,6'-Hexachlorobiphenyl (BZ 135)	NELAP	PA	12/17/2012

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ 179)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5,6-Hexachlorobiphenyl (BZ 134)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',5-Pentachlorobiphenyl (BZ 83)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',6,6'-Hexachlorobiphenyl (BZ 136)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3',6-Pentachlorobiphenyl (BZ 84)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,3'-Tetrachlorobiphenyl (BZ 40)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5',6-Hexachlorobiphenyl (BZ 149)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5'-Pentachlorobiphenyl (BZ 97)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,5',6-Heptachlorobiphenyl (BZ 187)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,5'-Hexachlorobiphenyl (BZ 146)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,6'-Hexachlorobiphenyl (BZ 148)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ 188)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5,6-Hexachlorobiphenyl (BZ 147)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',5-Pentachlorobiphenyl (BZ 90)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',6'-Pentachlorobiphenyl (BZ 98)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',6,6'-Hexachlorobiphenyl (BZ 150)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4',6-Pentachlorobiphenyl (BZ 91)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4'-Tetrachlorobiphenyl (BZ 42)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5',6-Heptachlorobiphenyl (BZ 183)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5'-Hexachlorobiphenyl (BZ 138)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ 203)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ 180)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ 182)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ 204)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ 181)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',5-Hexachlorobiphenyl (BZ 137)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',6'-Hexachlorobiphenyl (BZ 140)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ 184)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4',6-Hexachlorobiphenyl (BZ 139)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,4'-Pentachlorobiphenyl (BZ 85)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5',6-Hexachlorobiphenyl (BZ 144)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5'-Pentachlorobiphenyl (BZ 87)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ 185)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,5'-Hexachlorobiphenyl (BZ 141)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,6'-Hexachlorobiphenyl (BZ 143)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ 186)	NELAP	PA	12/17/2012

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,2',3,4,5,6-Hexachlorobiphenyl (BZ 142)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,5-Pentachlorobiphenyl (BZ 86)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,6'-Pentachlorobiphenyl (BZ 89)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,6,6'-Hexachlorobiphenyl (BZ 145)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4,6-Pentachlorobiphenyl (BZ 88)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,4-Tetrachlorobiphenyl (BZ 41)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5',6-Pentachlorobiphenyl (BZ 95)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5'-Tetrachlorobiphenyl (BZ 44)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,5',6-Hexachlorobiphenyl (BZ 151)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,5'-Pentachlorobiphenyl (BZ 92)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,6'-Pentachlorobiphenyl (BZ 94)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,6,6'-Hexachlorobiphenyl (BZ 152)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5,6-Pentachlorobiphenyl (BZ 93)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,5-Tetrachlorobiphenyl (BZ 43)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,6'-Tetrachlorobiphenyl (BZ 46)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,6,6'-Pentachlorobiphenyl (BZ 96)	NELAP	PA	12/17/2012
EPA 1668		2,2',3,6-Tetrachlorobiphenyl (BZ 45)	NELAP	PA	12/17/2012
EPA 1668		2,2',3-Trichlorobiphenyl (BZ 16)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',5,5'-Hexachlorobiphenyl (BZ 153)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',5,6'-Hexachlorobiphenyl (BZ 154)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',5-Pentachlorobiphenyl (BZ 99)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',6,6'-Hexachlorobiphenyl (BZ 155)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4',6-Pentachlorobiphenyl (BZ 100)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,4'-Tetrachlorobiphenyl (BZ 47)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5',6-Pentachlorobiphenyl (BZ 103)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5'-Tetrachlorobiphenyl (BZ 49)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5,5'-Pentachlorobiphenyl (BZ 101)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5,6'-Pentachlorobiphenyl (BZ 102)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,5-Tetrachlorobiphenyl (BZ 48)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,6'-Tetrachlorobiphenyl (BZ 51)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,6,6'-Pentachlorobiphenyl (BZ 104)	NELAP	PA	12/17/2012
EPA 1668		2,2',4,6-Tetrachlorobiphenyl (BZ 50)	NELAP	PA	12/17/2012
EPA 1668		2,2',4-Trichlorobiphenyl (BZ 17)	NELAP	PA	12/17/2012
EPA 1668		2,2',5,5'-Tetrachlorobiphenyl (BZ 52)	NELAP	PA	12/17/2012
EPA 1668		2,2',5,6'-Tetrachlorobiphenyl (BZ 53)	NELAP	PA	12/17/2012
EPA 1668		2,2',5-Trichlorobiphenyl (BZ 18)	NELAP	PA	12/17/2012
EPA 1668		2,2',6,6'-Tetrachlorobiphenyl (BZ 54)	NELAP	PA	12/17/2012
EPA 1668		2,2',6-Trichlorobiphenyl (BZ 19)	NELAP	PA	12/17/2012
EPA 1668		2,2'-Dichlorobiphenyl (BZ 4)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5',6-Pentachlorobiphenyl (BZ 125)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5'-Tetrachlorobiphenyl (BZ 76)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5,5'-Pentachlorobiphenyl (BZ 124)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',5-Tetrachlorobiphenyl (BZ 70)	NELAP	PA	12/17/2012
EPA 1668		2,3',4',6-Tetrachlorobiphenyl (BZ 71)	NELAP	PA	12/17/2012
EPA 1668		2,3',4'-Trichlorobiphenyl (BZ 33)	NELAP	PA	12/17/2012

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 EPA Lab Code: PA00009 TNI Code: (717) 656-2300
PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,3',4,4',5',6-Hexachlorobiphenyl (BZ 168)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5'-Pentachlorobiphenyl (BZ 123)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5,5'-Hexachlorobiphenyl (BZ 167)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',5-Pentachlorobiphenyl (BZ 118)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4',6-Pentachlorobiphenyl (BZ 119)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,4'-Tetrachlorobiphenyl (BZ 66)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5',6-Pentachlorobiphenyl (BZ 121)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5'-Tetrachlorobiphenyl (BZ 68)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5,5'-Pentachlorobiphenyl (BZ 120)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,5-Tetrachlorobiphenyl (BZ 67)	NELAP	PA	12/17/2012
EPA 1668		2,3',4,6-Tetrachlorobiphenyl (BZ 69)	NELAP	PA	12/17/2012
EPA 1668		2,3',4-Trichlorobiphenyl (BZ 25)	NELAP	PA	12/17/2012
EPA 1668		2,3',5',6-Tetrachlorobiphenyl (BZ 73)	NELAP	PA	12/17/2012
EPA 1668		2,3',5'-Trichlorobiphenyl (BZ 34)	NELAP	PA	12/17/2012
EPA 1668		2,3',5,5'-Tetrachlorobiphenyl (BZ 72)	NELAP	PA	12/17/2012
EPA 1668		2,3',5-Trichlorobiphenyl (BZ 26)	NELAP	PA	12/17/2012
EPA 1668		2,3',6-Trichlorobiphenyl (BZ 27)	NELAP	PA	12/17/2012
EPA 1668		2,3'-Dichlorobiphenyl (BZ 6)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5',6-Hexachlorobiphenyl (BZ 164)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5'-Pentachlorobiphenyl (BZ 122)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ 193)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5,5'-Hexachlorobiphenyl (BZ 162)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5,6-Hexachlorobiphenyl (BZ 163)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',5-Pentachlorobiphenyl (BZ 107)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4',6-Pentachlorobiphenyl (BZ 110)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4'-Tetrachlorobiphenyl (BZ 56)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ 191)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5'-Hexachlorobiphenyl (BZ 157)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ 205)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ 189)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ 190)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',5-Hexachlorobiphenyl (BZ 156)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4',6-Hexachlorobiphenyl (BZ 158)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,4'-Pentachlorobiphenyl (BZ 105)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5',6-Hexachlorobiphenyl (BZ 161)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5'-Pentachlorobiphenyl (BZ 108)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ 192)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5,5'-Hexachlorobiphenyl (BZ 159)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5,6-Hexachlorobiphenyl (BZ 160)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,5-Pentachlorobiphenyl (BZ 106)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',4,6-Pentachlorobiphenyl (BZ 109)	NELAP	PA	12/17/2012

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		2,3,3',4-Tetrachlorobiphenyl (BZ 55)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5',6-Pentachlorobiphenyl (BZ 113)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5'-Tetrachlorobiphenyl (BZ 58)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5,5',6-Hexachlorobiphenyl (BZ 165)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5,5'-Pentachlorobiphenyl (BZ 111)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5,6-Pentachlorobiphenyl (BZ 112)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',5-Tetrachlorobiphenyl (BZ 57)	NELAP	PA	12/17/2012
EPA 1668		2,3,3',6-Tetrachlorobiphenyl (BZ 59)	NELAP	PA	12/17/2012
EPA 1668		2,3,3'-Trichlorobiphenyl (BZ 20)	NELAP	PA	12/17/2012
EPA 1668		2,3,4',5,6-Pentachlorobiphenyl (BZ 117)	NELAP	PA	12/17/2012
EPA 1668		2,3,4',5-Tetrachlorobiphenyl (BZ 63)	NELAP	PA	12/17/2012
EPA 1668		2,3,4',6-Tetrachlorobiphenyl (BZ 64)	NELAP	PA	12/17/2012
EPA 1668		2,3,4'-Trichlorobiphenyl (BZ 22)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4',5,6-Hexachlorobiphenyl (BZ 166)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4',5-Pentachlorobiphenyl (BZ 114)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4',6-Pentachlorobiphenyl (BZ 115)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,4'-Tetrachlorobiphenyl (BZ 60)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,5,6-Pentachlorobiphenyl (BZ 116)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,5-Tetrachlorobiphenyl (BZ 61)	NELAP	PA	12/17/2012
EPA 1668		2,3,4,6-Tetrachlorobiphenyl (BZ 62)	NELAP	PA	12/17/2012
EPA 1668		2,3,4-Trichlorobiphenyl (BZ 21)	NELAP	PA	12/17/2012
EPA 1668		2,3,5,6-Tetrachlorobiphenyl (BZ 65)	NELAP	PA	12/17/2012
EPA 1668		2,3,5-Trichlorobiphenyl (BZ 23)	NELAP	PA	12/17/2012
EPA 1668		2,3,6-Trichlorobiphenyl (BZ 24)	NELAP	PA	12/17/2012
EPA 1668		2,3-Dichlorobiphenyl (BZ 5)	NELAP	PA	12/17/2012
EPA 1668		2,4',5-Trichlorobiphenyl (BZ 31)	NELAP	PA	12/17/2012
EPA 1668		2,4',6-Trichlorobiphenyl (BZ 32)	NELAP	PA	12/17/2012
EPA 1668		2,4'-Dichlorobiphenyl (BZ 8)	NELAP	PA	12/17/2012
EPA 1668		2,4,4',5-Tetrachlorobiphenyl (BZ 74)	NELAP	PA	12/17/2012
EPA 1668		2,4,4',6-Tetrachlorobiphenyl (BZ 75)	NELAP	PA	12/17/2012
EPA 1668		2,4,4'-Trichlorobiphenyl (BZ 28)	NELAP	PA	12/17/2012
EPA 1668		2,4,5-Trichlorobiphenyl (BZ 29)	NELAP	PA	12/17/2012
EPA 1668		2,4,6-Trichlorobiphenyl (BZ 30)	NELAP	PA	12/17/2012
EPA 1668		2,4-Dichlorobiphenyl (BZ 7)	NELAP	PA	12/17/2012
EPA 1668		2,5-Dichlorobiphenyl (BZ 9)	NELAP	PA	12/17/2012
EPA 1668		2,6-Dichlorobiphenyl (BZ 10)	NELAP	PA	12/17/2012
EPA 1668		2-Chlorobiphenyl (BZ 1)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,4',5,5'-Hexachlorobiphenyl (BZ 169)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,4',5-Pentachlorobiphenyl (BZ 126)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,4'-Tetrachlorobiphenyl (BZ 77)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,5'-Tetrachlorobiphenyl (BZ 79)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,5,5'-Pentachlorobiphenyl (BZ 127)	NELAP	PA	12/17/2012
EPA 1668		3,3',4,5-Tetrachlorobiphenyl (BZ 78)	NELAP	PA	12/17/2012
EPA 1668		3,3',4-Trichlorobiphenyl (BZ 35)	NELAP	PA	12/17/2012
EPA 1668		3,3',5,5'-Tetrachlorobiphenyl (BZ 80)	NELAP	PA	12/17/2012

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Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 1668		3,3',5-Trichlorobiphenyl (BZ 36)	NELAP	PA	12/17/2012
EPA 1668		3,3'-Dichlorobiphenyl (BZ 11)	NELAP	PA	12/17/2012
EPA 1668		3,4',5-Trichlorobiphenyl (BZ 39)	NELAP	PA	12/17/2012
EPA 1668		3,4'-Dichlorobiphenyl (BZ 13)	NELAP	PA	12/17/2012
EPA 1668		3,4,4',5-Tetrachlorobiphenyl (BZ 81)	NELAP	PA	12/17/2012
EPA 1668		3,4,4'-Trichlorobiphenyl (BZ 37)	NELAP	PA	12/17/2012
EPA 1668		3,4,5-Trichlorobiphenyl (BZ 38)	NELAP	PA	12/17/2012
EPA 1668		3,4-Dichlorobiphenyl (BZ 12)	NELAP	PA	12/17/2012
EPA 1668		3,5-Dichlorobiphenyl (BZ 14)	NELAP	PA	12/17/2012
EPA 1668		3-Chlorobiphenyl (BZ 2)	NELAP	PA	12/17/2012
EPA 1668		4,4'-Dichlorobiphenyl (BZ 15)	NELAP	PA	12/17/2012
EPA 1668		4-Chlorobiphenyl (BZ 3)	NELAP	PA	12/17/2012
EPA 1668		Decachlorobiphenyl	NELAP	PA	12/17/2012
EPA 1668	C	PCBs as congeners by HRGC/HRMS	NELAP	PA	3/4/2015
EPA 1668	A	PCBs as congeners by HRGC/HRMS	NELAP	PA	3/4/2015
EPA 300.0	2.1	Bromide	NELAP	PA	10/16/2012
EPA 300.0	2.1	Chloride	NELAP	PA	10/30/2014
EPA 300.0	2.1	Fluoride	NELAP	PA	10/16/2012
EPA 300.0	2.1	Nitrate as N	NELAP	PA	10/16/2012
EPA 300.0	2.1	Nitrite as N	NELAP	PA	10/16/2012
EPA 300.0	2.1	Sulfate	NELAP	PA	10/16/2012
EPA 3050	B	Acid digestion of solids	NELAP	PA	4/4/2005
EPA 3060	A	Alkaline digestion of Cr(VI)	NELAP	PA	4/4/2005
EPA 350.3		Ammonia as N	NELAP	PA	12/8/2014
EPA 3510	C	Separatory funnel liquid-liquid extraction	NELAP	PA	4/4/2005
EPA 3540	C	Soxhlet extraction	NELAP	PA	4/4/2005
EPA 3546		Microwave extraction	NELAP	PA	9/25/2009
EPA 3550		Ultrasonic extraction	NELAP	PA	4/4/2005
EPA 3550	C	Ultrasonic extraction	NELAP	PA	3/4/2015
EPA 3620	B	Florisil cleanup	NELAP	PA	4/4/2005
EPA 3630	C	Silica gel cleanup	NELAP	PA	4/4/2005
EPA 3640	A	Gel permeation cleanup (GPC)	NELAP	PA	4/4/2005
EPA 3660	B	Sulfur cleanup	NELAP	PA	4/4/2005
EPA 3665	A	Sulfuric acid/permanganate clean-up	NELAP	PA	4/4/2005
EPA 5030		Bulk purge-and-trap (methanol)	NELAP	PA	12/4/2007
EPA 5035		Closed-system purge-and-trap (bisulfate option)	NELAP	PA	12/12/2005
EPA 5035		Closed-system purge-and-trap (methanol option)	NELAP	PA	4/4/2005
EPA 5035		Closed-system purge-and-trap (unpreserved)	NELAP	PA	4/4/2005
EPA 6010		Aluminum	NELAP	PA	1/19/2005
EPA 6010		Antimony	NELAP	PA	1/19/2005
EPA 6010		Arsenic	NELAP	PA	1/19/2005
EPA 6010		Barium	NELAP	PA	1/19/2005
EPA 6010		Beryllium	NELAP	PA	1/19/2005
EPA 6010		Boron	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 6010		Cadmium	NELAP	PA	1/19/2005
EPA 6010		Calcium	NELAP	PA	1/19/2005
EPA 6010		Chromium	NELAP	PA	1/19/2005
EPA 6010		Cobalt	NELAP	PA	1/19/2005
EPA 6010		Copper	NELAP	PA	1/19/2005
EPA 6010		Iron	NELAP	PA	1/19/2005
EPA 6010		Lead	NELAP	PA	1/19/2005
EPA 6010		Lithium	NELAP	PA	1/20/2012
EPA 6010		Magnesium	NELAP	PA	1/19/2005
EPA 6010		Manganese	NELAP	PA	1/19/2005
EPA 6010	C	Metals by ICP/AES	NELAP	PA	3/26/2012
EPA 6010	B	Metals by ICP/AES	NELAP	PA	3/26/2012
EPA 6010		Molybdenum	NELAP	PA	1/19/2005
EPA 6010		Nickel	NELAP	PA	1/19/2005
EPA 6010		Potassium	NELAP	PA	1/19/2005
EPA 6010		Selenium	NELAP	PA	1/19/2005
EPA 6010		Silica, as SiO2	NELAP	PA	1/20/2012
EPA 6010		Silver	NELAP	PA	1/19/2005
EPA 6010		Sodium	NELAP	PA	1/19/2005
EPA 6010		Strontium	NELAP	PA	1/19/2005
EPA 6010		Sulfur	NELAP	PA	12/19/2011
EPA 6010		Thallium	NELAP	PA	1/19/2005
EPA 6010		Tin	NELAP	PA	1/19/2005
EPA 6010		Titanium	NELAP	PA	1/19/2005
EPA 6010		Vanadium	NELAP	PA	1/19/2005
EPA 6010		Zinc	NELAP	PA	1/19/2005
EPA 6010		Zirconium	NELAP	PA	7/29/2015
EPA 6020		Aluminum	NELAP	PA	4/29/2010
EPA 6020		Antimony	NELAP	PA	1/19/2005
EPA 6020		Arsenic	NELAP	PA	1/19/2005
EPA 6020		Barium	NELAP	PA	1/20/2012
EPA 6020		Beryllium	NELAP	PA	1/19/2005
EPA 6020		Boron	NELAP	PA	4/29/2010
EPA 6020		Cadmium	NELAP	PA	1/19/2005
EPA 6020		Calcium	NELAP	PA	4/29/2010
EPA 6020		Chromium	NELAP	PA	1/19/2005
EPA 6020		Cobalt	NELAP	PA	4/29/2010
EPA 6020		Copper	NELAP	PA	1/19/2005
EPA 6020		Iron	NELAP	PA	4/29/2010
EPA 6020		Lead	NELAP	PA	1/19/2005
EPA 6020		Magnesium	NELAP	PA	4/29/2010
EPA 6020		Manganese	NELAP	PA	4/29/2010
EPA 6020	A	Metals by ICP/MS	NELAP	PA	3/26/2012
EPA 6020		Molybdenum	NELAP	PA	7/25/2011
EPA 6020		Nickel	NELAP	PA	4/4/2005

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PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 6020		Potassium	NELAP	PA	4/29/2010
EPA 6020		Selenium	NELAP	PA	4/4/2005
EPA 6020		Silver	NELAP	PA	2/23/2010
EPA 6020		Sodium	NELAP	PA	4/29/2010
EPA 6020		Strontium	NELAP	PA	4/29/2010
EPA 6020		Thallium	NELAP	PA	1/19/2005
EPA 6020		Tin	NELAP	PA	4/29/2010
EPA 6020		Titanium	NELAP	PA	4/29/2010
EPA 6020		Vanadium	NELAP	PA	1/7/2010
EPA 6020		Zinc	NELAP	PA	2/1/2011
EPA 6850		Perchlorate	NELAP	PA	1/19/2011
EPA 7.3.3.2		Reactive cyanide	NELAP	PA	12/12/2005
EPA 7.3.4.2		Reactive sulfide	NELAP	PA	12/12/2005
EPA 7196		Chromium VI	NELAP	PA	1/19/2005
EPA 7199		Chromium VI	NELAP	PA	5/2/2006
EPA 7471		Mercury	NELAP	PA	10/17/2007
EPA 8011		1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	3/19/2015
EPA 8011		1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	3/19/2015
EPA 8011		1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	6/12/2015
EPA 8015		Diesel-range organics (DRO)	NELAP	PA	4/4/2005
EPA 8015		Ethanol	NELAP	PA	1/19/2005
EPA 8015		Ethylene glycol	NELAP	PA	12/4/2007
EPA 8015		Gasoline-range organics (GRO)	NELAP	PA	4/4/2005
EPA 8015		Isopropyl alcohol (2-Propanol)	NELAP	PA	12/4/2007
EPA 8015		Methanol	NELAP	PA	1/19/2005
EPA 8015	C	Nonhalogenated organics by GC/FID	NELAP	PA	3/26/2012
EPA 8015	B	Nonhalogenated organics by GC/FID	NELAP	PA	3/26/2012
EPA 8015	D	Nonhalogenated organics by GC/FID	NELAP	PA	7/29/2015
EPA 8021		Benzene	NELAP	PA	1/19/2005
EPA 8021		Ethylbenzene	NELAP	PA	1/19/2005
EPA 8021		Isopropylbenzene (Cumene)	NELAP	PA	1/24/2007
EPA 8021		Methyl tert-butyl ether (MTBE)	NELAP	PA	5/2/2006
EPA 8021		Naphthalene	NELAP	PA	12/4/2007
EPA 8021		Toluene	NELAP	PA	1/19/2005
EPA 8021	B	VOCs by GC/PID/ELCD	NELAP	PA	3/26/2012
EPA 8021		Xylenes, total	NELAP	PA	1/19/2005
EPA 8021		m-Xylene	NELAP	PA	1/24/2007
EPA 8021		o-Xylene	NELAP	PA	1/24/2007
EPA 8021		p-Xylene	NELAP	PA	1/24/2007
EPA 8081		4,4'-DDD	NELAP	PA	1/19/2005
EPA 8081		4,4'-DDE	NELAP	PA	1/19/2005
EPA 8081		4,4'-DDT	NELAP	PA	1/19/2005
EPA 8081		Aldrin (HHDN)	NELAP	PA	1/19/2005
EPA 8081		Chlordane (tech.)	NELAP	PA	1/19/2005

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8081		Dieldrin	NELAP	PA	1/19/2005
EPA 8081		Endosulfan I	NELAP	PA	1/19/2005
EPA 8081		Endosulfan II	NELAP	PA	1/19/2005
EPA 8081		Endosulfan sulfate	NELAP	PA	1/19/2005
EPA 8081		Endrin	NELAP	PA	1/19/2005
EPA 8081		Endrin aldehyde	NELAP	PA	1/19/2005
EPA 8081		Endrin ketone	NELAP	PA	1/19/2005
EPA 8081		Heptachlor	NELAP	PA	1/19/2005
EPA 8081		Heptachlor epoxide	NELAP	PA	1/19/2005
EPA 8081		Kepone	NELAP	PA	1/19/2005
EPA 8081		Methoxychlor	NELAP	PA	1/19/2005
EPA 8081		Mirex	NELAP	PA	1/19/2005
EPA 8081	A	Organochlorine pesticides by GC/ECD	NELAP	PA	3/26/2012
EPA 8081	B	Organochlorine pesticides by GC/ECD	NELAP	PA	1/1/2013
EPA 8081		Toxaphene (Chlorinated camphene)	NELAP	PA	1/19/2005
EPA 8081		alpha-BHC (alpha-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 8081		alpha-Chlordane	NELAP	PA	4/4/2005
EPA 8081		beta-BHC (beta-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 8081		delta-BHC (delta-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 8081		gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	NELAP	PA	1/19/2005
EPA 8081		gamma-Chlordane	NELAP	PA	4/4/2005
EPA 8082		Aroclor-1016 (PCB-1016)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1016 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1221 (PCB-1221)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1221 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1232 (PCB-1232)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1232 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1242 (PCB-1242)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1242 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1248 (PCB-1248)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1248 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1254 (PCB-1254)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1254 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1260 (PCB-1260)	NELAP	PA	1/2/2007
EPA 8082		Aroclor-1260 (in oil)	NELAP	PA	5/24/2011
EPA 8082		Aroclor-1262 (PCB-1262)	NELAP	PA	7/23/2008
EPA 8082		Aroclor-1268 (PCB-1268)	NELAP	PA	7/23/2008
EPA 8082		Decachlorobiphenyl	NELAP	PA	12/17/2012
EPA 8082	A	PCBs by GC/ECD	NELAP	PA	3/26/2012
EPA 8141		Alachlor (Lasso)	NELAP	PA	1/21/2009
EPA 8141		Atrazine	NELAP	PA	1/19/2005
EPA 8141		Azinphos-methyl (Guthion)	NELAP	PA	4/4/2005
EPA 8141		Bolstar (Sulprofos)	NELAP	PA	1/19/2005
EPA 8141		Carbophenothion (Trithion)	NELAP	PA	11/9/2012
EPA 8141		Chlorpyrifos	NELAP	PA	4/4/2005

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8141		Coumaphos	NELAP	PA	1/19/2005
EPA 8141		Demeton-O	NELAP	PA	1/19/2005
EPA 8141		Demeton-S	NELAP	PA	1/19/2005
EPA 8141		Diazinon (Spectracide)	NELAP	PA	1/19/2005
EPA 8141		Dichlorovos (DDVP, Dichlorvos)	NELAP	PA	1/19/2005
EPA 8141		Disulfoton	NELAP	PA	1/19/2005
EPA 8141		EPN (Santox)	NELAP	PA	1/19/2005
EPA 8141		Ethion	NELAP	PA	1/19/2005
EPA 8141		Ethoprop (Prophos)	NELAP	PA	1/19/2005
EPA 8141		Famphur	NELAP	PA	1/19/2005
EPA 8141		Fensulfothion	NELAP	PA	1/19/2005
EPA 8141		Fenthion	NELAP	PA	4/4/2005
EPA 8141		Malathion	NELAP	PA	1/19/2005
EPA 8141		Merphos	NELAP	PA	1/19/2005
EPA 8141		Methyl parathion (Parathion, methyl)	NELAP	PA	5/25/2005
EPA 8141		Mevinphos	NELAP	PA	1/19/2005
EPA 8141		Naled	NELAP	PA	1/19/2005
EPA 8141	A	Organophosphorus compounds by GC/NPD	NELAP	PA	3/26/2012
EPA 8141	B	Organophosphorus compounds by GC/NPD	NELAP	PA	3/26/2012
EPA 8141		Parathion, ethyl (Ethyl parathion, Parathion)	NELAP	PA	1/19/2005
EPA 8141		Phorate (Thimet)	NELAP	PA	1/19/2005
EPA 8141		Ronnel	NELAP	PA	1/19/2005
EPA 8141		Simazine	NELAP	PA	1/4/2006
EPA 8141		Stirophos (Tetrachlorovinphos)	NELAP	PA	1/19/2005
EPA 8141		Tokuthion (Prothiophos)	NELAP	PA	1/19/2005
EPA 8141		Trichloronate	NELAP	PA	1/19/2005
EPA 8151		2,4,5-T	NELAP	PA	1/19/2005
EPA 8151		2,4,5-TP (Silvex)	NELAP	PA	1/19/2005
EPA 8151		2,4-D	NELAP	PA	1/19/2005
EPA 8151		2,4-DB (Butoxon)	NELAP	PA	4/4/2005
EPA 8151	A	Chlorinated herbicides by GC/ECD	NELAP	PA	3/26/2012
EPA 8151		Dalapon (2,2-Dichloropropionic acid)	NELAP	PA	1/19/2005
EPA 8151		Dicamba	NELAP	PA	1/19/2005
EPA 8151		Dichloroprop (Dichlorprop)	NELAP	PA	1/19/2005
EPA 8151		Dinoseb (2-sec-Butyl-4,6-dinitrophenol, DNBP)	NELAP	PA	1/19/2005
EPA 8151		MCPA	NELAP	PA	1/19/2005
EPA 8151		MCPP (Mecoprop)	NELAP	PA	5/2/2006
EPA 8151		Pentachlorophenol (PCP)	NELAP	PA	1/19/2005
EPA 8151		Picloram (4-Amino-3,5,6-trichloro-2-pyridinecarboxylic acid)	NELAP	PA	1/19/2005
EPA 8260		1,1,1,2-Tetrachloroethane	NELAP	PA	1/19/2005
EPA 8260		1,1,1-Trichloroethane	NELAP	PA	1/19/2005
EPA 8260		1,1,2,2-Tetrachloroethane	NELAP	PA	1/19/2005
EPA 8260		1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	NELAP	PA	5/2/2006

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PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260		1,1,2-Trichloroethane	NELAP	PA	1/19/2005
EPA 8260		1,1-Dichloroethane	NELAP	PA	1/19/2005
EPA 8260		1,1-Dichloroethene (1,1-Dichloroethylene)	NELAP	PA	1/19/2005
EPA 8260		1,1-Dichloropropene	NELAP	PA	1/19/2005
EPA 8260		1,2,3-Trichlorobenzene	NELAP	PA	1/19/2005
EPA 8260		1,2,3-Trichloropropane (1,2,3-TCP)	NELAP	PA	1/19/2005
EPA 8260		1,2,4-Trichlorobenzene	NELAP	PA	1/19/2005
EPA 8260		1,2,4-Trimethylbenzene	NELAP	PA	1/19/2005
EPA 8260		1,2-Dibromo-3-chloropropane (DBCP, Dibromochloropropane)	NELAP	PA	1/19/2005
EPA 8260		1,2-Dibromoethane (EDB, Ethylene dibromide)	NELAP	PA	1/19/2005
EPA 8260		1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 8260		1,2-Dichloroethane	NELAP	PA	1/19/2005
EPA 8260		1,2-Dichloropropane	NELAP	PA	1/19/2005
EPA 8260		1,3,5-Trimethylbenzene	NELAP	PA	1/19/2005
EPA 8260		1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 8260		1,3-Dichloropropane	NELAP	PA	1/19/2005
EPA 8260		1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 8260		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	1/19/2005
EPA 8260		2,2-Dichloropropane	NELAP	PA	1/19/2005
EPA 8260		2-Butanone (Methyl ethyl ketone, MEK)	NELAP	PA	1/19/2005
EPA 8260		2-Chloroethyl vinyl ether	NELAP	PA	1/19/2005
EPA 8260		2-Chlorotoluene	NELAP	PA	5/2/2006
EPA 8260		2-Hexanone	NELAP	PA	1/19/2005
EPA 8260		2-Nitropropane	NELAP	PA	12/17/2012
EPA 8260		3,3'-Dimethyl-1-butanol	NELAP	PA	4/17/2009
EPA 8260		4-Chloro-2-nitrophenol	NELAP	PA	5/2/2006
EPA 8260		4-Chlorotoluene	NELAP	PA	1/19/2005
EPA 8260		4-Methyl-2-pentanone (MIBK)	NELAP	PA	1/19/2005
EPA 8260		Acetone	NELAP	PA	1/19/2005
EPA 8260		Acetonitrile	NELAP	PA	1/4/2006
EPA 8260		Acrolein (Propenal)	NELAP	PA	1/19/2005
EPA 8260		Acrylonitrile	NELAP	PA	1/19/2005
EPA 8260		Allyl chloride (3-Chloropropene)	NELAP	PA	1/19/2005
EPA 8260		Benzene	NELAP	PA	1/19/2005
EPA 8260		Benzyl chloride	NELAP	PA	1/4/2006
EPA 8260		Bromobenzene	NELAP	PA	1/19/2005
EPA 8260		Bromochloromethane	NELAP	PA	1/19/2005
EPA 8260		Bromodichloromethane	NELAP	PA	1/19/2005
EPA 8260		Bromoform	NELAP	PA	1/19/2005
EPA 8260		Carbon disulfide	NELAP	PA	1/19/2005
EPA 8260		Carbon tetrachloride	NELAP	PA	1/19/2005
EPA 8260		Chlorobenzene	NELAP	PA	1/19/2005
EPA 8260		Chloroethane	NELAP	PA	1/19/2005
EPA 8260		Chloroform	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260		Chloroprene (2-Chloro-1,3-butadiene)	NELAP	PA	4/17/2009
EPA 8260		Crotonaldehyde	NELAP	PA	10/30/2014
EPA 8260		Cyclohexane	NELAP	PA	6/29/2010
EPA 8260		Cyclohexanone	NELAP	PA	7/3/2007
EPA 8260		Dibromochloromethane	NELAP	PA	1/19/2005
EPA 8260		Dibromomethane	NELAP	PA	1/19/2005
EPA 8260		Dichlorodifluoromethane (Freon 12)	NELAP	PA	1/19/2005
EPA 8260		Diisopropyl ether (DIPE)	NELAP	PA	7/3/2007
EPA 8260		Epichlorohydrin (1-Chloro-2,3-epoxypropane)	NELAP	PA	1/4/2006
EPA 8260		Ethanol	NELAP	PA	1/4/2006
EPA 8260		Ethyl acetate	NELAP	PA	1/4/2006
EPA 8260		Ethyl methacrylate	NELAP	PA	1/4/2006
EPA 8260		Ethyl tert-butyl ether (ETBE)	NELAP	PA	7/3/2007
EPA 8260		Ethylbenzene	NELAP	PA	1/19/2005
EPA 8260		Ethylene oxide	NELAP	PA	10/30/2014
EPA 8260		Gasoline-range organics (GRO)	NELAP	PA	6/8/2006
EPA 8260		Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	1/19/2005
EPA 8260		Isobutyl alcohol (2-Methyl-1-propanol)	NELAP	PA	7/3/2007
EPA 8260		Isopropyl alcohol (2-Propanol)	NELAP	PA	1/19/2005
EPA 8260		Isopropylbenzene (Cumene)	NELAP	PA	8/7/2005
EPA 8260		Methacrylonitrile	NELAP	PA	1/24/2007
EPA 8260		Methyl acetate	NELAP	PA	6/29/2010
EPA 8260		Methyl bromide (Bromomethane)	NELAP	PA	1/19/2005
EPA 8260		Methyl chloride (Chloromethane)	NELAP	PA	1/19/2005
EPA 8260		Methyl iodide (Iodomethane)	NELAP	PA	5/2/2006
EPA 8260		Methyl tert-butyl ether (MTBE)	NELAP	PA	1/19/2005
EPA 8260		Methylcyclohexane	NELAP	PA	1/21/2009
EPA 8260		Methylene chloride (Dichloromethane)	NELAP	PA	1/19/2005
EPA 8260		Methylmethacrylate	NELAP	PA	5/2/2006
EPA 8260		Naphthalene	NELAP	PA	1/19/2005
EPA 8260		Pentachloroethane	NELAP	PA	1/24/2007
EPA 8260		Propionitrile (Ethyl cyanide)	NELAP	PA	1/24/2007
EPA 8260		Styrene	NELAP	PA	1/19/2005
EPA 8260		Tetrachloroethene (PCE, Perchloroethylene)	NELAP	PA	1/19/2005
EPA 8260		Tetrahydrofuran (THF)	NELAP	PA	6/7/2012
EPA 8260		Toluene	NELAP	PA	1/19/2005
EPA 8260		Trichloroethene (TCE, Trichloroethylene)	NELAP	PA	1/19/2005
EPA 8260		Trichlorofluoromethane (Freon 11)	NELAP	PA	1/19/2005
EPA 8260	B	VOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8260	C	VOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8260		Vinyl acetate	NELAP	PA	1/19/2005
EPA 8260		Vinyl chloride (Chloroethene)	NELAP	PA	1/19/2005
EPA 8260		Xylenes, total	NELAP	PA	1/19/2005
EPA 8260		cis-1,2-Dichloroethene	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8260		cis-1,3-Dichloropropene	NELAP	PA	1/19/2005
EPA 8260		m+p-Xylene	NELAP	PA	1/24/2007
EPA 8260		n-Butyl alcohol (n-Butanol, 1-Butanol)	NELAP	PA	1/19/2005
EPA 8260		n-Butylbenzene	NELAP	PA	1/19/2005
EPA 8260		n-Propylbenzene	NELAP	PA	1/4/2006
EPA 8260		o-Xylene	NELAP	PA	1/24/2007
EPA 8260		p-Isopropyltoluene (4-Isopropyltoluene)	NELAP	PA	1/24/2007
EPA 8260		sec-Butylbenzene	NELAP	PA	1/19/2005
EPA 8260		tert-Amyl alcohol (2-Methyl-2-butanol)	NELAP	PA	4/17/2009
EPA 8260		tert-Amyl methyl ether (TAME)	NELAP	PA	7/3/2007
EPA 8260		tert-Butyl alcohol (2-Methyl-2-propanol)	NELAP	PA	1/19/2005
EPA 8260		tert-Butyl ethyl ether	NELAP	PA	5/25/2007
EPA 8260		tert-Butyl formate	NELAP	PA	4/17/2009
EPA 8260		tert-Butylbenzene	NELAP	PA	1/19/2005
EPA 8260		trans-1,2-Dichloroethene	NELAP	PA	1/19/2005
EPA 8260		trans-1,3-Dichloropropene	NELAP	PA	1/19/2005
EPA 8260		trans-1,4-Dichloro-2-butene	NELAP	PA	7/3/2007
EPA 8260 SIM		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	4/17/2009
EPA 8270		1,1'-Biphenyl (Biphenyl, Lemonene)	NELAP	PA	12/4/2007
EPA 8270		1,2,3,4-Tetrachlorobenzene	NELAP	PA	7/3/2007
EPA 8270		1,2,3,4-Tetrahydronaphthalene	NELAP	PA	12/4/2007
EPA 8270		1,2,3,5-Tetrachlorobenzene	NELAP	PA	7/3/2007
EPA 8270		1,2,4,5-Tetrachlorobenzene	NELAP	PA	4/4/2005
EPA 8270		1,2,4-Trichlorobenzene	NELAP	PA	1/19/2005
EPA 8270		1,2-Dichlorobenzene (o-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 8270		1,2-Dinitrobenzene (1,2-DNB)	NELAP	PA	1/19/2005
EPA 8270		1,2-Diphenylhydrazine	NELAP	PA	5/2/2006
EPA 8270		1,3,5-Trinitrobenzene (1,3,5-TNB)	NELAP	PA	1/4/2006
EPA 8270		1,3-Dichlorobenzene (m-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 8270		1,3-Dinitrobenzene (1,3-DNB)	NELAP	PA	1/19/2005
EPA 8270		1,4-Dichlorobenzene (p-Dichlorobenzene)	NELAP	PA	1/19/2005
EPA 8270		1,4-Dinitrobenzene (1,4-DNB)	NELAP	PA	5/2/2006
EPA 8270		1,4-Dioxane (1,4-Diethyleneoxide)	NELAP	PA	12/4/2007
EPA 8270		1,4-Naphthoquinone	NELAP	PA	1/19/2005
EPA 8270		1,4-Phenylenediamine	NELAP	PA	1/19/2005
EPA 8270		1-Chloronaphthalene	NELAP	PA	1/4/2006
EPA 8270		1-Methylnaphthalene	NELAP	PA	12/4/2007
EPA 8270		1-Naphthylamine (alpha-Naphthylamine)	NELAP	PA	4/4/2005
EPA 8270		2,2'-Oxybis(1-chloropropane) (bis(2-Chloro-1-methylethyl) ether)	NELAP	PA	10/30/2014
EPA 8270		2,3,4,6-Tetrachlorophenol	NELAP	PA	1/19/2005
EPA 8270		2,4,5-Trichlorophenol	NELAP	PA	1/19/2005
EPA 8270		2,4,6-Trichlorophenol	NELAP	PA	1/19/2005
EPA 8270		2,4-Dichlorophenol	NELAP	PA	1/19/2005
EPA 8270		2,4-Dimethylphenol	NELAP	PA	1/19/2005
EPA 8270		2,4-Dinitrophenol	NELAP	PA	1/19/2005

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Laboratory Scope of Accreditation

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	1/19/2005
EPA 8270		2,6-Dichlorophenol	NELAP	PA	1/19/2005
EPA 8270		2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	1/19/2005
EPA 8270		2-Acetylaminofluorene	NELAP	PA	1/19/2005
EPA 8270		2-Chloronaphthalene	NELAP	PA	1/19/2005
EPA 8270		2-Chlorophenol	NELAP	PA	1/19/2005
EPA 8270		2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NELAP	PA	1/19/2005
EPA 8270		2-Methylnaphthalene	NELAP	PA	1/19/2005
EPA 8270		2-Methylphenol (o-Cresol)	NELAP	PA	1/19/2005
EPA 8270		2-Naphthylamine (beta-Naphthylamine)	NELAP	PA	5/17/2005
EPA 8270		2-Nitroaniline	NELAP	PA	4/4/2005
EPA 8270		2-Nitrophenol	NELAP	PA	1/19/2005
EPA 8270		2-Picoline (2-Methylpyridine)	NELAP	PA	1/19/2005
EPA 8270		3+4-Methylphenol (m+p-Cresol)	NELAP	PA	1/19/2005
EPA 8270		3,3'-Dichlorobenzidine	NELAP	PA	1/19/2005
EPA 8270		3,3'-Dimethoxybenzidine	NELAP	PA	4/17/2009
EPA 8270		3,3'-Dimethylbenzidine	NELAP	PA	1/19/2005
EPA 8270		3-Methylcholanthrene	NELAP	PA	1/19/2005
EPA 8270		3-Nitroaniline	NELAP	PA	1/19/2005
EPA 8270		4,4'-Methylenebis(2-chloroaniline)	NELAP	PA	1/19/2005
EPA 8270		4-Aminobiphenyl	NELAP	PA	1/19/2005
EPA 8270		4-Bromophenyl phenyl ether	NELAP	PA	1/19/2005
EPA 8270		4-Chloro-3-methylphenol	NELAP	PA	1/19/2005
EPA 8270		4-Chloroaniline	NELAP	PA	1/19/2005
EPA 8270		4-Chlorophenyl phenyl ether	NELAP	PA	1/19/2005
EPA 8270		4-Nitroaniline	NELAP	PA	4/4/2005
EPA 8270		4-Nitrophenol	NELAP	PA	1/19/2005
EPA 8270		4-Nitroquinoline-1-oxide	NELAP	PA	7/3/2007
EPA 8270		5-Nitro-o-toluidine	NELAP	PA	4/4/2005
EPA 8270		6-Methylchrysene	NELAP	PA	12/4/2007
EPA 8270		7,12-Dimethylbenz(a)anthracene	NELAP	PA	1/19/2005
EPA 8270		Acenaphthene	NELAP	PA	1/19/2005
EPA 8270		Acenaphthylene	NELAP	PA	1/19/2005
EPA 8270		Acetophenone	NELAP	PA	1/19/2005
EPA 8270		Acrylamide	NELAP	PA	1/21/2009
EPA 8270		Aniline	NELAP	PA	1/19/2005
EPA 8270		Anthracene	NELAP	PA	1/19/2005
EPA 8270		Aramite	NELAP	PA	5/17/2005
EPA 8270		Atrazine	NELAP	PA	1/12/2007
EPA 8270		Benzaldehyde	NELAP	PA	12/4/2007
EPA 8270		Benzenethiol	NELAP	PA	12/4/2007
EPA 8270		Benzidine	NELAP	PA	1/19/2005
EPA 8270		Benzo[a]anthracene	NELAP	PA	1/19/2005
EPA 8270		Benzo[a]pyrene	NELAP	PA	1/19/2005
EPA 8270		Benzo[b]fluoranthene	NELAP	PA	1/19/2005

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		Benzo[ghi]perylene	NELAP	PA	1/19/2005
EPA 8270		Benzo[k]fluoranthene	NELAP	PA	1/19/2005
EPA 8270		Benzoic acid	NELAP	PA	1/19/2005
EPA 8270		Benzyl alcohol	NELAP	PA	1/19/2005
EPA 8270		Butyl benzyl phthalate (Benzyl butyl phthalate)	NELAP	PA	5/17/2005
EPA 8270		Caprolactam	NELAP	PA	12/4/2007
EPA 8270		Carbazole	NELAP	PA	1/19/2005
EPA 8270		Chlorobenzilate	NELAP	PA	5/2/2006
EPA 8270		Chrysene (Benzo[a]phenanthrene)	NELAP	PA	1/19/2005
EPA 8270		Di-n-butyl phthalate	NELAP	PA	1/19/2005
EPA 8270		Di-n-octyl phthalate	NELAP	PA	1/19/2005
EPA 8270		Diallate (cis or trans)	NELAP	PA	5/2/2006
EPA 8270		Dibenz[a,h]acridine	NELAP	PA	12/4/2007
EPA 8270		Dibenz[a,j]acridine	NELAP	PA	5/17/2005
EPA 8270		Dibenzo[a,h]anthracene	NELAP	PA	1/19/2005
EPA 8270		Dibenzofuran	NELAP	PA	1/19/2005
EPA 8270		Diethyl phthalate	NELAP	PA	1/19/2005
EPA 8270		Dimethoate	NELAP	PA	5/2/2006
EPA 8270		Dimethyl phthalate	NELAP	PA	1/19/2005
EPA 8270		Diphenylamine	NELAP	PA	5/2/2006
EPA 8270		Disulfoton	NELAP	PA	7/1/2007
EPA 8270		Ethyl methanesulfonate	NELAP	PA	1/19/2005
EPA 8270		Famphur	NELAP	PA	5/2/2006
EPA 8270		Fluoranthene	NELAP	PA	1/19/2005
EPA 8270		Fluorene	NELAP	PA	1/19/2005
EPA 8270		Hexachlorobenzene	NELAP	PA	1/19/2005
EPA 8270		Hexachlorobutadiene (1,3-Hexachlorobutadiene)	NELAP	PA	1/19/2005
EPA 8270		Hexachlorocyclopentadiene	NELAP	PA	1/19/2005
EPA 8270		Hexachloroethane	NELAP	PA	1/19/2005
EPA 8270		Hexachloropropene	NELAP	PA	1/19/2005
EPA 8270		Indene	NELAP	PA	12/4/2007
EPA 8270		Indeno(1,2,3-cd)pyrene	NELAP	PA	1/19/2005
EPA 8270		Isodrin	NELAP	PA	5/2/2006
EPA 8270		Isophorone	NELAP	PA	1/19/2005
EPA 8270		Isosafrole	NELAP	PA	1/19/2005
EPA 8270		Kepone	NELAP	PA	5/2/2006
EPA 8270		Malononitrile	NELAP	PA	5/23/2013
EPA 8270		Methapyrilene	NELAP	PA	1/19/2005
EPA 8270		Methyl methanesulfonate	NELAP	PA	1/19/2005
EPA 8270		Methyl parathion (Parathion, methyl)	NELAP	PA	5/25/2007
EPA 8270		N,N-Dimethylacetamide	NELAP	PA	12/4/2007
EPA 8270		N,N-Dimethylformamide	NELAP	PA	12/4/2007
EPA 8270		N-Nitrosodi-n-butylamine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosodi-n-propylamine	NELAP	PA	1/19/2005

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DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**
PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270		N-Nitrosodiethylamine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosodimethylamine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosodiphenylamine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosomethylethylamine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosomorpholine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosopiperidine	NELAP	PA	1/19/2005
EPA 8270		N-Nitrosopyrrolidine	NELAP	PA	1/19/2005
EPA 8270		Naphthalene	NELAP	PA	1/19/2005
EPA 8270		Nitrobenzene	NELAP	PA	1/4/2006
EPA 8270		O,O,O-Triethyl phosphorothioate	NELAP	PA	5/2/2006
EPA 8270		Parathion, ethyl (Ethyl parathion, Parathion)	NELAP	PA	5/25/2007
EPA 8270		Pentachlorobenzene	NELAP	PA	1/19/2005
EPA 8270		Pentachloronitrobenzene (PCNB)	NELAP	PA	1/19/2005
EPA 8270		Pentachlorophenol (PCP)	NELAP	PA	1/19/2005
EPA 8270		Phenacetin	NELAP	PA	1/19/2005
EPA 8270		Phenanthrene	NELAP	PA	1/19/2005
EPA 8270		Phenol	NELAP	PA	1/19/2005
EPA 8270		Phorate (Tbimet)	NELAP	PA	5/2/2006
EPA 8270		Phthalic anhydride	NELAP	PA	1/21/2009
EPA 8270		Pronamide (Kerb)	NELAP	PA	1/19/2005
EPA 8270		Pyrene	NELAP	PA	1/19/2005
EPA 8270		Pyridine	NELAP	PA	4/4/2005
EPA 8270		Quinoline	NELAP	PA	12/4/2007
EPA 8270	C	SOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8270	D	SOCs by GC/MS	NELAP	PA	3/26/2012
EPA 8270		Safrole	NELAP	PA	1/19/2005
EPA 8270		Sulfotepp (Tetraethyl dithiopyrophosphate)	NELAP	PA	12/4/2007
EPA 8270		Tetraethyl lead	NELAP	PA	3/7/2012
EPA 8270		Thionazine (Thionazin, Zinophos)	NELAP	PA	5/2/2006
EPA 8270		a,a-Dimethylphenethylamine (Phentermine)	NELAP	PA	5/2/2006
EPA 8270		bis(2-Chloroethoxy)methane	NELAP	PA	1/19/2005
EPA 8270		bis(2-Chloroethyl) ether	NELAP	PA	1/19/2005
EPA 8270		bis(2-Chloroisopropyl) ether	NELAP	PA	1/4/2006
EPA 8270		bis(2-Chloromethyl) ether	NELAP	PA	1/21/2009
EPA 8270		bis(2-Ethylhexyl) adipate (di(2-Ethylhexyl) adipate)	NELAP	PA	1/21/2009
EPA 8270		bis(2-Ethylhexyl) phthalate (DEHP)	NELAP	PA	1/19/2005
EPA 8270		o-Toluidine (2-Toluidine, 2-Methylaniline)	NELAP	PA	1/19/2005
EPA 8270		p-(Dimethylamino)azobenzene	NELAP	PA	5/2/2006
EPA 8270		p-Chloronitrobenzene	NELAP	PA	1/21/2009
EPA 8270		tris-(2,3-Dibromopropyl) phosphate (tris-BP)	NELAP	PA	12/4/2007
EPA 8270 SIM		1-Methylnaphthalene	NELAP	PA	7/25/2011
EPA 8270 SIM		2-Methylnaphthalene	NELAP	PA	5/23/2012
EPA 8270 SIM		Acenaphthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Acenaphthylene	NELAP	PA	12/4/2007

Aaron Alger

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pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8270 SIM		Anthracene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[a]anthracene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[a]pyrene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[b]fluoranthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[ghi]perylene	NELAP	PA	12/4/2007
EPA 8270 SIM		Benzo[k]fluoranthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Chrysene (Benzo[a]phenanthrene)	NELAP	PA	12/4/2007
EPA 8270 SIM		Dibenzo[a,h]anthracene	NELAP	PA	12/4/2007
EPA 8270 SIM		Fluoranthene	NELAP	PA	12/4/2007
EPA 8270 SIM		Fluorene	NELAP	PA	12/4/2007
EPA 8270 SIM		Indeno(1,2,3-cd)pyrene	NELAP	PA	12/4/2007
EPA 8270 SIM		Naphthalene	NELAP	PA	12/4/2007
EPA 8270 SIM		Phenanthrene	NELAP	PA	12/4/2007
EPA 8270 SIM		Pyrene	NELAP	PA	12/4/2007
EPA 8290		1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	8/6/2010
EPA 8290		1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	NELAP	PA	6/30/2010
EPA 8290		1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	NELAP	PA	6/30/2010
EPA 8290		2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	NELAP	PA	8/6/2010
EPA 8290		2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)(Dioxin)	NELAP	PA	6/30/2010
EPA 8290		2,3,7,8-Tetrachlorodibenzofuran (TCDF)	NELAP	PA	6/30/2010
EPA 8290		PCDDs and PCDFs by HRGC-HRMS	NELAP	PA	3/26/2012
EPA 8290	A	PCDDs and PCDFs by HRGC-HRMS	NELAP	PA	3/4/2015
EPA 8290		Total TCDD	NELAP	PA	6/30/2010

Aaron Alger

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pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8290		Total TCDF	NELAP	PA	6/30/2010
EPA 8290		Total heptachlorodibenzo-p-dioxin (HpCDD)	NELAP	PA	6/30/2010
EPA 8290		Total heptachlorodibenzofuran (HpCDF)	NELAP	PA	6/30/2010
EPA 8290		Total hexachlorodibenzo-p-dioxin (HxCDD)	NELAP	PA	6/30/2010
EPA 8290		Total hexachlorodibenzofuran (HxCDF)	NELAP	PA	6/30/2010
EPA 8290		Total pentachlorodibenzo-p-dioxin (PeCDD)	NELAP	PA	6/30/2010
EPA 8290		Total pentachlorodibenzofuran (PeCDF)	NELAP	PA	6/30/2010
EPA 8315		2,5-Dimethylbenzaldehyde	NELAP	PA	1/21/2009
EPA 8315		Acetaldehyde	NELAP	PA	1/21/2009
EPA 8315		Benzaldehyde	NELAP	PA	1/21/2009
EPA 8315		Butanal (Butyraldehyde)	NELAP	PA	1/21/2009
EPA 8315	A	Carbonyl compounds by HPLC	NELAP	PA	3/26/2012
EPA 8315		Crotonaldehyde	NELAP	PA	1/21/2009
EPA 8315		Formaldehyde	NELAP	PA	1/19/2005
EPA 8315		Hexanal (Hexaldehyde)	NELAP	PA	1/21/2009
EPA 8315		Isovaleraldehyde	NELAP	PA	1/21/2009
EPA 8315		Pentanal (Valeraldehyde)	NELAP	PA	1/21/2009
EPA 8315		Propanal (Propionaldehyde)	NELAP	PA	1/21/2009
EPA 8315		m-Tolualdehyde (1,3-Tolualdehyde)	NELAP	PA	1/21/2009
EPA 8315		o-Tolualdehyde (1,2-Tolualdehyde)	NELAP	PA	1/21/2009
EPA 8315		p-Tolualdehyde (1,4-Tolualdehyde)	NELAP	PA	1/21/2009
EPA 8318		3-Hydroxycarbofuran	NELAP	PA	4/4/2005
EPA 8318		Aldicarb (Temik)	NELAP	PA	4/4/2005
EPA 8318		Aldicarb sulfone	NELAP	PA	4/4/2005
EPA 8318		Aldicarb sulfoxide	NELAP	PA	12/12/2005
EPA 8318		Carbaryl (Sevin)	NELAP	PA	4/4/2005
EPA 8318		Carbofuran (Furaden)	NELAP	PA	4/4/2005
EPA 8318		Methiocarb (Mesurol)	NELAP	PA	4/4/2005
EPA 8318		Methomyl (Lannate)	NELAP	PA	4/4/2005
EPA 8318	A	N-Methylcarbamates by HPLC	NELAP	PA	10/15/2012
EPA 8318		Oxamyl (Vydate)	NELAP	PA	12/12/2005
EPA 8318		Propoxur (Baygon)	NELAP	PA	4/4/2005
EPA 8330		1,3,5-Trinitrobenzene (1,3,5-TNB)	NELAP	PA	1/19/2005
EPA 8330		1,3-Dinitrobenzene (1,3-DNB)	NELAP	PA	1/19/2005
EPA 8330		2,4,6-Trinitrotoluene (2,4,6-TNT)	NELAP	PA	1/19/2005
EPA 8330		2,4-Diamino-6-nitrotoluene	NELAP	PA	7/29/2015
EPA 8330		2,4-Dinitrotoluene (2,4-DNT)	NELAP	PA	1/19/2005
EPA 8330		2,6-Diamino-4-nitrotoluene	NELAP	PA	7/29/2015
EPA 8330		2,6-Dinitrotoluene (2,6-DNT)	NELAP	PA	1/19/2005
EPA 8330		2-Amino-4,6-dinitrotoluene (2-Am-DNT)	NELAP	PA	1/19/2005
EPA 8330		2-Nitrotoluene	NELAP	PA	1/19/2005
EPA 8330		3,5-Dinitroaniline	NELAP	PA	7/29/2015
EPA 8330		3-Nitrotoluene	NELAP	PA	1/19/2005
EPA 8330		4-Amino-2,6-dinitrotoluene (4-Am-DNT)	NELAP	PA	1/19/2005
EPA 8330		4-Nitrotoluene	NELAP	PA	1/19/2005

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pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Laboratory Scope of Accreditation

Attached to Certificate of Accreditation 014-006 expiration date January 31, 2016. This listing of accredited analytes should be used only when associated with a valid certificate of accreditation.

DEP Laboratory ID: 36-00037 **EPA Lab Code: PA00009** **TNI Code:** **(717) 656-2300**

PADWIS ID: 36037

Matrix: Solid and Chemical Materials

Method	Revision	Analyte	Accreditation Type	Primary	Effective Date
EPA 8330		Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	NELAP	PA	1/19/2005
EPA 8330		Nitroaromatics and nitramines by HPLC/UV	NELAP	PA	3/26/2012
EPA 8330	A	Nitroaromatics and nitramines by HPLC/UV	NELAP	PA	3/26/2012
EPA 8330	B	Nitroaromatics and nitramines by HPLC/UV	NELAP	PA	7/29/2015
EPA 8330		Nitrobenzene	NELAP	PA	1/19/2005
EPA 8330		Nitroglycerin	NELAP	PA	10/9/2013
EPA 8330		Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	NELAP	PA	1/24/2006
EPA 8330		Pentaerythritol tetranitrate (PETN)	NELAP	PA	11/21/2005
EPA 8330		RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	NELAP	PA	1/19/2005
EPA 9012		Total cyanide	NELAP	PA	4/18/2013
EPA 9045		pH	NELAP	PA	11/19/2008
EPA 9050	A	Conductivity	NELAP	PA	1/27/2014
EPA 9050		Conductivity	NELAP	PA	5/17/2005
EPA 9060		Total organic carbon (TOC)	NELAP	PA	1/19/2005
EPA 9066		Total phenolics	NELAP	PA	4/4/2005
EPA 9071	B	Oil and grease	NELAP	PA	1/19/2005
EPA 9081		Cation exchange capacity of soils (Ammonium acetate)	NELAP	PA	5/25/2005
EPA 9095	A	Paint filter liquids test	NELAP	PA	1/24/2007
EPA Lloyd Kahn Method		Total organic carbon (TOC)	NELAP	PA	10/9/2013
FL-PRO		Total petroleum hydrocarbons (TPH)	NELAP	PA	12/12/2005
MA DEP EPH	1.1	C11-C22 Aromatics	NELAP	PA	7/15/2013
MA DEP EPH	1.1	C19-C36 Aliphatics	NELAP	PA	7/15/2013
MA DEP EPH	1.1	C9-C18 Aliphatics	NELAP	PA	7/15/2013
MA DEP VPH	1.1	C5-C8 Aliphatics	NELAP	PA	7/15/2013
MA DEP VPH	1.1	C9-C10 Aromatics	NELAP	PA	7/15/2013
MA DEP VPH	1.1	C9-C12 Aliphatics	NELAP	PA	7/15/2013
NWTPH-Dx		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
NWTPH-Gx		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
SM 2540 G		Residue, total	NELAP	PA	2/25/2014
SM 2540 G		Total, fixed, and volatile residue	NELAP	PA	3/19/2015
SM 5310 B		Total organic carbon (TOC)	NELAP	PA	10/9/2013
TX1005 (TNRCC)		Total petroleum hydrocarbons (TPH)	NELAP	PA	12/12/2005
TX1006 (TNRCC)		Total petroleum hydrocarbons (TPH)	NELAP	PA	12/12/2005
WA-EPH		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
WA-VPH		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005
WI-DRO		Diesel-range organics (DRO)	NELAP	PA	12/12/2005
WI-GRO		Gasoline-range organics (GRO)	NELAP	PA	12/12/2005

Aaron Alger

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STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Issue Date: July 1, 2015

Eurofins Lancaster Laboratories Inc
AI Number: 30729
Expiration Date: June 30, 2016

2425 New Holland Pike, Lancaster, Pennsylvania 17601-5994

Certificate Number: 02055

Air Emissions

Analyte	Method Name	Method Code	Type	AB
4385 - Bromobenzene	EPA TO-15 (extended)	2368	NELAP	LA
4577 - Chlorodifluoromethane (Freon-22)	EPA TO-15 (extended)	2368	NELAP	LA
4627 - Dichlorofluoromethane (Freon 21)	EPA TO-15 (extended)	2368	NELAP	LA
4645 - cis-1,2-Dichloroethylene	EPA TO-15 (extended)	2368	NELAP	LA
5027 - n-Octane	EPA TO-15 (extended)	2368	NELAP	LA
5028 - n-Pentane	EPA TO-15 (extended)	2368	NELAP	LA
100170 - Gaseous Organic Compound Emissions	EPA 18	10246636	NELAP	LA
100077 - Gaseous Nonmethane Organic Emissions	EPA Method 25	10246738	NELAP	LA
5105 - 1,1,1,2-Tetrachloroethane	EPA TO-15	10248803	NELAP	LA
5160 - 1,1,1-Trichloroethane	EPA TO-15	10248803	NELAP	LA
5110 - 1,1,2,2-Tetrachloroethane	EPA TO-15	10248803	NELAP	LA
5195 - 1,1,2-Trichloro-1,2,2-trifluoroethane	EPA TO-15	10248803	NELAP	LA
5165 - 1,1,2-Trichloroethane	EPA TO-15	10248803	NELAP	LA
4630 - 1,1-Dichloroethane	EPA TO-15	10248803	NELAP	LA
4640 - 1,1-Dichloroethylene	EPA TO-15	10248803	NELAP	LA
5155 - 1,2,4-Trichlorobenzene	EPA TO-15	10248803	NELAP	LA
5210 - 1,2,4-Trimethylbenzene	EPA TO-15	10248803	NELAP	LA
4570 - 1,2-Dibromo-3-chloropropane (DBCP)	EPA TO-15	10248803	NELAP	LA
4585 - 1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA TO-15	10248803	NELAP	LA
4695 - 1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon-114)	EPA TO-15	10248803	NELAP	LA
4610 - 1,2-Dichlorobenzene	EPA TO-15	10248803	NELAP	LA
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA TO-15	10248803	NELAP	LA
4655 - 1,2-Dichloropropane	EPA TO-15	10248803	NELAP	LA
5215 - 1,3,5-Trimethylbenzene	EPA TO-15	10248803	NELAP	LA
9318 - 1,3-Butadiene	EPA TO-15	10248803	NELAP	LA
4615 - 1,3-Dichlorobenzene	EPA TO-15	10248803	NELAP	LA
4620 - 1,4-Dichlorobenzene	EPA TO-15	10248803	NELAP	LA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA TO-15	10248803	NELAP	LA
5220 - 2,2,4-Trimethylpentane (Isooctane)	EPA TO-15	10248803	NELAP	LA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA TO-15	10248803	NELAP	LA
4535 - 2-Chlorotoluene	EPA TO-15	10248803	NELAP	LA
4860 - 2-Hexanone	EPA TO-15	10248803	NELAP	LA
4542 - 4-Ethyltoluene	EPA TO-15	10248803	NELAP	LA
4995 - 4-Methyl-2-pentanone (MIBK)	EPA TO-15	10248803	NELAP	LA
4315 - Acetone	EPA TO-15	10248803	NELAP	LA
4320 - Acetonitrile	EPA TO-15	10248803	NELAP	LA
4325 - Acrolein (Propenal)	EPA TO-15	10248803	NELAP	LA
4340 - Acrylonitrile	EPA TO-15	10248803	NELAP	LA
4355 - Allyl chloride (3-Chloropropene)	EPA TO-15	10248803	NELAP	LA
4375 - Benzene	EPA TO-15	10248803	NELAP	LA
5635 - Benzyl chloride	EPA TO-15	10248803	NELAP	LA
4395 - Bromodichloromethane	EPA TO-15	10248803	NELAP	LA
4400 - Bromoform	EPA TO-15	10248803	NELAP	LA

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

Air Emissions

Analyte	Method Name	Method Code	Type	AB
4450 - Carbon disulfide	EPA TO-15	10248803	NELAP	LA
4455 - Carbon tetrachloride	EPA TO-15	10248803	NELAP	LA
4475 - Chlorobenzene	EPA TO-15	10248803	NELAP	LA
4575 - Chlorodibromomethane	EPA TO-15	10248803	NELAP	LA
4485 - Chloroethane (Ethyl chloride)	EPA TO-15	10248803	NELAP	LA
4505 - Chloroform	EPA TO-15	10248803	NELAP	LA
4555 - Cyclohexane	EPA TO-15	10248803	NELAP	LA
9375 - Di-isopropylether (DIPE) (Isopropyl ether)	EPA TO-15	10248803	NELAP	LA
4595 - Dibromomethane (Methylene bromide)	EPA TO-15	10248803	NELAP	LA
4625 - Dichlorodifluoromethane (Freon-12)	EPA TO-15	10248803	NELAP	LA
4750 - Ethanol	EPA TO-15	10248803	NELAP	LA
4755 - Ethyl acetate	EPA TO-15	10248803	NELAP	LA
4760 - Ethyl acrylate	EPA TO-15	10248803	NELAP	LA
4810 - Ethyl methacrylate	EPA TO-15	10248803	NELAP	LA
4770 - Ethyl-t-butyl ether (ETBE) (2-Ethoxy-2-methylpropane)	EPA TO-15	10248803	NELAP	LA
4765 - Ethylbenzene	EPA TO-15	10248803	NELAP	LA
4835 - Hexachlorobutadiene	EPA TO-15	10248803	NELAP	LA
4840 - Hexachloroethane	EPA TO-15	10248803	NELAP	LA
4870 - Iodomethane (Methyl iodide)	EPA TO-15	10248803	NELAP	LA
4900 - Isopropylbenzene	EPA TO-15	10248803	NELAP	LA
4945 - Methyl acrylate	EPA TO-15	10248803	NELAP	LA
4950 - Methyl bromide (Bromomethane)	EPA TO-15	10248803	NELAP	LA
4960 - Methyl chloride (Chloromethane)	EPA TO-15	10248803	NELAP	LA
100201 - Methyl isobutyl ketone (Hexanone)	EPA TO-15	10248803	NELAP	LA
4990 - Methyl methacrylate	EPA TO-15	10248803	NELAP	LA
5000 - Methyl tert-butyl ether (MTBE)	EPA TO-15	10248803	NELAP	LA
4975 - Methylene chloride (Dichloromethane)	EPA TO-15	10248803	NELAP	LA
5005 - Naphthalene	EPA TO-15	10248803	NELAP	LA
4836 - Propylene	EPA TO-15	10248803	NELAP	LA
5100 - Styrene	EPA TO-15	10248803	NELAP	LA
4370 - T-amylmethylether (TAME)	EPA TO-15	10248803	NELAP	LA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA TO-15	10248803	NELAP	LA
5120 - Tetrahydrofuran (THF)	EPA TO-15	10248803	NELAP	LA
5140 - Toluene	EPA TO-15	10248803	NELAP	LA
5170 - Trichloroethene (Trichloroethylene)	EPA TO-15	10248803	NELAP	LA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA TO-15	10248803	NELAP	LA
5225 - Vinyl acetate	EPA TO-15	10248803	NELAP	LA
5230 - Vinyl bromide (Bromoethane)	EPA TO-15	10248803	NELAP	LA
5235 - Vinyl chloride	EPA TO-15	10248803	NELAP	LA
5260 - Xylene (total)	EPA TO-15	10248803	NELAP	LA
4705 - cis & trans-1,2-Dichloroethene	EPA TO-15	10248803	NELAP	LA
4645 - cis-1,2-Dichloroethylene	EPA TO-15	10248803	NELAP	LA
4680 - cis-1,3-Dichloropropene	EPA TO-15	10248803	NELAP	LA
5240 - m+p-xylene	EPA TO-15	10248803	NELAP	LA
5245 - m-Xylene	EPA TO-15	10248803	NELAP	LA
4435 - n-Butylbenzene	EPA TO-15	10248803	NELAP	LA
4825 - n-Heptane	EPA TO-15	10248803	NELAP	LA
4855 - n-Hexane	EPA TO-15	10248803	NELAP	LA
5090 - n-Propylbenzene	EPA TO-15	10248803	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
5250 - o-Xylene	EPA TO-15	10248803	NELAP	LA
5255 - p-Xylene	EPA TO-15	10248803	NELAP	LA
4440 - sec-Butylbenzene	EPA TO-15	10248803	NELAP	LA
4420 - tert-Butyl alcohol	EPA TO-15	10248803	NELAP	LA
4445 - tert-Butylbenzene	EPA TO-15	10248803	NELAP	LA
4700 - trans-1,2-Dichloroethylene	EPA TO-15	10248803	NELAP	LA
4685 - trans-1,3-Dichloropropylene	EPA TO-15	10248803	NELAP	LA
5105 - 1,1,1,2-Tetrachloroethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5160 - 1,1,1-Trichloroethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5110 - 1,1,2,2-Tetrachloroethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5195 - 1,1,2-Trichloro-1,2,2-trifluoroethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5165 - 1,1,2-Trichloroethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
4630 - 1,1-Dichloroethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
4640 - 1,1-Dichloroethylene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5180 - 1,2,3-Trichloropropane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5155 - 1,2,4-Trichlorobenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5210 - 1,2,4-Trimethylbenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4585 - 1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4695 - 1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon-114)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4610 - 1,2-Dichlorobenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4655 - 1,2-Dichloropropane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5215 - 1,3,5-Trimethylbenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4615 - 1,3-Dichlorobenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4835 - 1,3-Hexachlorobutadiene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4620 - 1,4-Dichlorobenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA TO-14A, Rev.2	10312002	NELAP	LA
5220 - 2,2,4-Trimethylpentane (Isooctane)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4860 - 2-Hexanone	EPA TO-14A, Rev.2	10312002	NELAP	LA
4542 - 4-Ethyltoluene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4995 - 4-Methyl-2-pentanone (MIBK)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4315 - Acetone	EPA TO-14A, Rev.2	10312002	NELAP	LA
4375 - Benzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5635 - Benzyl chloride	EPA TO-14A, Rev.2	10312002	NELAP	LA
4385 - Bromobenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4395 - Bromodichloromethane	EPA TO-14A, Rev.2	10312002	NELAP	LA
4400 - Bromoform	EPA TO-14A, Rev.2	10312002	NELAP	LA
4450 - Carbon disulfide	EPA TO-14A, Rev.2	10312002	NELAP	LA
4455 - Carbon tetrachloride	EPA TO-14A, Rev.2	10312002	NELAP	LA
4475 - Chlorobenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4485 - Chloroethane (Ethyl chloride)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4505 - Chloroform	EPA TO-14A, Rev.2	10312002	NELAP	LA
4555 - Cyclohexane	EPA TO-14A, Rev.2	10312002	NELAP	LA
4625 - Dichlorodifluoromethane (Freon-12)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4755 - Ethyl acetate	EPA TO-14A, Rev.2	10312002	NELAP	LA
4765 - Ethylbenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4835 - Hexachlorobutadiene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4950 - Methyl bromide (Bromomethane)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4960 - Methyl chloride (Chloromethane)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4990 - Methyl methacrylate	EPA TO-14A, Rev.2	10312002	NELAP	LA
5000 - Methyl tert-butyl ether (MTBE)	EPA TO-14A, Rev.2	10312002	NELAP	LA

Air Emissions

Analyte	Method Name	Method Code	Type	AB
4975 - Methylene chloride (Dichloromethane)	EPA TO-14A, Rev.2	10312002	NELAP	LA
5100 - Styrene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA TO-14A, Rev.2	10312002	NELAP	LA
5140 - Toluene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5170 - Trichloroethene (Trichloroethylene)	EPA TO-14A, Rev.2	10312002	NELAP	LA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA TO-14A, Rev.2	10312002	NELAP	LA
5225 - Vinyl acetate	EPA TO-14A, Rev.2	10312002	NELAP	LA
5235 - Vinyl chloride	EPA TO-14A, Rev.2	10312002	NELAP	LA
5260 - Xylene (total)	EPA TO-14A, Rev.2	10312002	NELAP	LA
4645 - cis-1,2-Dichloroethylene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4680 - cis-1,3-Dichloropropene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5240 - m+p-xylene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5027 - n-Octane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5028 - n-Pentane	EPA TO-14A, Rev.2	10312002	NELAP	LA
5090 - n-Propylbenzene	EPA TO-14A, Rev.2	10312002	NELAP	LA
5250 - o-Xylene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4700 - trans-1,2-Dichloroethylene	EPA TO-14A, Rev.2	10312002	NELAP	LA
4685 - trans-1,3-Dichloropropylene	EPA TO-14A, Rev.2	10312002	NELAP	LA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
9369 - Diesel range organics (DRO)	Texas 1006	867	NELAP	PA
6211 - EPH Aliphatic >C10-C12	Texas 1006	867	NELAP	PA
6212 - EPH Aliphatic >C12-C16	Texas 1006	867	NELAP	PA
6214 - EPH Aliphatic >C16-C21	Texas 1006	867	NELAP	PA
6216 - EPH Aliphatic >C21-C34	Texas 1006	867	NELAP	PA
6224 - EPH Aromatic >C10-C12	Texas 1006	867	NELAP	PA
6226 - EPH Aromatic >C12-C16	Texas 1006	867	NELAP	PA
6228 - EPH Aromatic >C16-C21	Texas 1006	867	NELAP	PA
6231 - EPH Aromatic >C21-C34	Texas 1006	867	NELAP	PA
6236 - EPH Aromatic C8-C10	Texas 1006	867	NELAP	PA
100163 - 1,5-pentanediol	EPA 625 (extended)	2326	NELAP	PA
100164 - 1,6-hexanediol	EPA 625 (extended)	2326	NELAP	PA
5145 - 2-Methylaniline (o-Toluidine)	EPA 625 (extended)	2326	NELAP	PA
6205 - Diphenylamine	EPA 625 (extended)	2326	NELAP	PA
6298 - Hexanoic acid	EPA 625 (extended)	2326	NELAP	PA
6335 - Maleic anhydride	EPA 625 (extended)	2326	NELAP	PA
5035 - Pentachloroethane	EPA 625 (extended)	2326	NELAP	PA
9547 - Pentanoic Acid	EPA 625 (extended)	2326	NELAP	PA
100199 - Sulfolane	EPA 625 (extended)	2326	NELAP	PA
100253 - Toluene diamines (total)	EPA 625 (extended)	2326	NELAP	PA
8262 - Tributyl phosphate	EPA 625 (extended)	2326	NELAP	PA
100252 - p-Toluidine	EPA 625 (extended)	2326	NELAP	PA
4720 - Diethylene glycol	EPA 8015C (extended)	2331	NELAP	PA
6657 - Propylene Glycol	EPA 8015C (extended)	2331	NELAP	PA
9646 - Triethylene Glycol	EPA 8015C (extended)	2331	NELAP	PA
4670 - 1,1-Dichloropropene	EPA 624 (extended)	2337	NELAP	PA
5150 - 1,2,3-Trichlorobenzene	EPA 624 (extended)	2337	NELAP	PA
4660 - 1,3-Dichloropropane	EPA 624 (extended)	2337	NELAP	PA
4675 - 1,3-Dichloropropene	EPA 624 (extended)	2337	NELAP	PA
4665 - 2,2-Dichloropropane	EPA 624 (extended)	2337	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
4535 - 2-Chlorotoluene	EPA 624 (extended)	2337	NELAP	PA
4540 - 4-Chlorotoluene	EPA 624 (extended)	2337	NELAP	PA
4910 - 4-Isopropyltoluene (p-Cymene)	EPA 624 (extended)	2337	NELAP	PA
4385 - Bromobenzene	EPA 624 (extended)	2337	NELAP	PA
4870 - Iodomethane (Methyl iodide)	EPA 624 (extended)	2337	NELAP	PA
4900 - Isopropylbenzene	EPA 624 (extended)	2337	NELAP	PA
4435 - n-Butylbenzene	EPA 624 (extended)	2337	NELAP	PA
5090 - n-Propylbenzene	EPA 624 (extended)	2337	NELAP	PA
4440 - sec-Butylbenzene	EPA 624 (extended)	2337	NELAP	PA
4445 - tert-Butylbenzene	EPA 624 (extended)	2337	NELAP	PA
1605 - Color	EPA 110.2	10005400	NELAP	PA
1755 - Total hardness as CaCO3	EPA 120.1	10006209	NELAP	PA
1610 - Conductivity	EPA 120.1	10006403	NELAP	PA
1750 - Hardness	EPA 130.2	10007202	NELAP	PA
1755 - Total hardness as CaCO3	EPA 130.2	10007202	NELAP	PA
1900 - pH	EPA 150.1	10008205	NELAP	PA
1955 - Residue-filterable (TDS)	EPA 160.1	10009004	NELAP	PA
1955 - Residue-filterable (TDS)	EPA 160.1	10009208	NELAP	PA
1960 - Residue-nonfilterable (TSS)	EPA 160.2	10009402	NELAP	PA
1950 - Residue-total	EPA 160.3	10009800	NELAP	PA
1970 - Residue-volatile	EPA 160.4	10010205	NELAP	PA
1970 - Residue-volatile	EPA 160.4	10010409	NELAP	PA
2030 - Temperature, deg. C	EPA 170.1	10011004	NELAP	PA
2055 - Turbidity	EPA 180.1	10011402	NELAP	PA
2055 - Turbidity	EPA 180.1, Rev.2	10011800	NELAP	PA
1015 - Barium	EPA 200.7	10013408	NELAP	PA
1080 - Lithium	EPA 200.7	10013408	NELAP	PA
1000 - Aluminum	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1005 - Antimony	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1010 - Arsenic	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1015 - Barium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1020 - Beryllium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1025 - Boron	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1030 - Cadmium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1035 - Calcium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1040 - Chromium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1050 - Cobalt	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1055 - Copper	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1070 - Iron	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1075 - Lead	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1085 - Magnesium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1090 - Manganese	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1100 - Molybdenum	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1105 - Nickel	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1125 - Potassium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1140 - Selenium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1150 - Silver	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1155 - Sodium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1160 - Strontium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1165 - Thallium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1175 - Tin	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1180 - Titanium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1185 - Vanadium	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1190 - Zinc	EPA 200.7, Rev.4.4	10013806	NELAP	PA
1000 - Aluminum	EPA 200.7	10014207	NELAP	PA
1005 - Antimony	EPA 200.7	10014207	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
1010 - Arsenic	EPA 200.7	10014207	NELAP	PA
1015 - Barium	EPA 200.7	10014207	NELAP	PA
1020 - Beryllium	EPA 200.7	10014207	NELAP	PA
1025 - Boron	EPA 200.7	10014207	NELAP	PA
1030 - Cadmium	EPA 200.7	10014207	NELAP	PA
1035 - Calcium	EPA 200.7	10014207	NELAP	PA
1040 - Chromium	EPA 200.7	10014207	NELAP	PA
1050 - Cobalt	EPA 200.7	10014207	NELAP	PA
1055 - Copper	EPA 200.7	10014207	NELAP	PA
1070 - Iron	EPA 200.7	10014207	NELAP	PA
1075 - Lead	EPA 200.7	10014207	NELAP	PA
1085 - Magnesium	EPA 200.7	10014207	NELAP	PA
1090 - Manganese	EPA 200.7	10014207	NELAP	PA
1100 - Molybdenum	EPA 200.7	10014207	NELAP	PA
1105 - Nickel	EPA 200.7	10014207	NELAP	PA
1125 - Potassium	EPA 200.7	10014207	NELAP	PA
1140 - Selenium	EPA 200.7	10014207	NELAP	PA
1150 - Silver	EPA 200.7	10014207	NELAP	PA
1155 - Sodium	EPA 200.7	10014207	NELAP	PA
1165 - Thallium	EPA 200.7	10014207	NELAP	PA
1175 - Tin	EPA 200.7	10014207	NELAP	PA
1185 - Vanadium	EPA 200.7	10014207	NELAP	PA
1190 - Zinc	EPA 200.7	10014207	NELAP	PA
1000 - Aluminum	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1005 - Antimony	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1010 - Arsenic	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1015 - Barium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1020 - Beryllium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1025 - Boron	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1030 - Cadmium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1035 - Calcium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1040 - Chromium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1050 - Cobalt	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1055 - Copper	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1070 - Iron	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1075 - Lead	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1085 - Magnesium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1090 - Manganese	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1100 - Molybdenum	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1105 - Nickel	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1125 - Potassium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1140 - Selenium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1150 - Silver	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1155 - Sodium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1160 - Strontium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1165 - Thallium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1175 - Tin	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1180 - Titanium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1185 - Vanadium	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1190 - Zinc	EPA 200.8, Rev.5.4	10014605	NELAP	PA
1045 - Chromium VI	EPA 218.6	10027802	NELAP	PA
1045 - Chromium VI	EPA 218.6, Rev.3.3	10028009	NELAP	PA
1095 - Mercury	EPA 245.1, Rev.3	10036609	NELAP	PA
1540 - Bromide	EPA 300.0	10053006	NELAP	PA
1730 - Fluoride	EPA 300.0	10053006	NELAP	PA
1810 - Nitrate as N	EPA 300.0	10053006	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
1540 - Bromide	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1575 - Chloride	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1730 - Fluoride	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1810 - Nitrate as N	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1835 - Nitrite	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1840 - Nitrite as N	EPA 300.0, Rev.2.1	10053200	NELAP	PA
2000 - Sulfate	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1505 - Alkalinity as CaCO3	EPA 310.1	10054601	NELAP	PA
1575 - Chloride	EPA 325.3	10057406	NELAP	PA
1645 - Total Cyanide	EPA 335.4	10061402	NELAP	PA
1515 - Ammonia as N	EPA 350.1, Rev.2	10063602	NELAP	PA
1515 - Ammonia as N	EPA 350.2	10063806	NELAP	PA
1515 - Ammonia as N	EPA 350.3	10064207	NELAP	PA
1795 - Kjeldahl nitrogen - total	EPA 351.2	10065006	NELAP	PA
1795 - Kjeldahl nitrogen - total	EPA 351.2, Rev.2	10065404	NELAP	PA
1810 - Nitrate as N	EPA 353.2	10067206	NELAP	PA
1840 - Nitrite as N	EPA 353.2	10067206	NELAP	PA
1825 - Total Nitrate+Nitrite	EPA 353.2	10067206	NELAP	PA
1810 - Nitrate as N	EPA 353.2, Rev.2	10067604	NELAP	PA
1820 - Nitrate-Nitrite	EPA 353.2, Rev.2	10067604	NELAP	PA
1840 - Nitrite as N	EPA 353.2, Rev.2	10067604	NELAP	PA
1880 - Oxygen, dissolved	EPA 360.1	10069008	NELAP	PA
1910 - Total Phosphorus	EPA 365.1, Rev.2	10070005	NELAP	PA
1870 - Orthophosphate as P	EPA 365.3	10070607	NELAP	PA
1870 - Orthophosphate as P	EPA 365.3	10070801	NELAP	PA
2000 - Sulfate	EPA 375.4	10073606	NELAP	PA
2005 - Sulfide	EPA 376.2	10074405	NELAP	PA
1555 - Carbonaceous BOD, CBOD	EPA 405.1	10075408	NELAP	PA
1565 - Chemical oxygen demand	EPA 410.1	10075806	NELAP	PA
1565 - Chemical oxygen demand	EPA 410.4	10077006	NELAP	PA
1565 - Chemical oxygen demand	EPA 410.4, Rev.2	10077404	NELAP	PA
2040 - Total Organic Carbon	EPA 415.1	10078203	NELAP	PA
2040 - Total Organic Carbon	EPA 415.1	10078407	NELAP	PA
1905 - Total Phenolics	EPA 420.4, Rev.1	10080203	NELAP	PA
2025 - Surfactants - MBAS	EPA 425.1	10080601	NELAP	PA
4375 - Benzene	EPA 602	10102202	NELAP	PA
4765 - Ethylbenzene	EPA 602	10102202	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	EPA 602	10102202	NELAP	PA
5005 - Naphthalene	EPA 602	10102202	NELAP	PA
5100 - Styrene	EPA 602	10102202	NELAP	PA
5140 - Toluene	EPA 602	10102202	NELAP	PA
5260 - Xylene (total)	EPA 602	10102202	NELAP	PA
5250 - o-Xylene	EPA 602	10102202	NELAP	PA
5255 - p-Xylene	EPA 602	10102202	NELAP	PA
7355 - 4,4'-DDD	EPA 608	10103603	NELAP	PA
7360 - 4,4'-DDE	EPA 608	10103603	NELAP	PA
7365 - 4,4'-DDT	EPA 608	10103603	NELAP	PA
7025 - Aldrin	EPA 608	10103603	NELAP	PA
8880 - Aroclor-1016 (PCB-1016)	EPA 608	10103603	NELAP	PA
8885 - Aroclor-1221 (PCB-1221)	EPA 608	10103603	NELAP	PA
8890 - Aroclor-1232 (PCB-1232)	EPA 608	10103603	NELAP	PA
8895 - Aroclor-1242 (PCB-1242)	EPA 608	10103603	NELAP	PA
8900 - Aroclor-1248 (PCB-1248)	EPA 608	10103603	NELAP	PA
8905 - Aroclor-1254 (PCB-1254)	EPA 608	10103603	NELAP	PA
8910 - Aroclor-1260 (PCB-1260)	EPA 608	10103603	NELAP	PA
7250 - Chlordane (tech.)	EPA 608	10103603	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
7470 - Dieldrin	EPA 608	10103603	NELAP	PA
7510 - Endosulfan I	EPA 608	10103603	NELAP	PA
7515 - Endosulfan II	EPA 608	10103603	NELAP	PA
7520 - Endosulfan sulfate	EPA 608	10103603	NELAP	PA
7540 - Endrin	EPA 608	10103603	NELAP	PA
7530 - Endrin aldehyde	EPA 608	10103603	NELAP	PA
7685 - Heptachlor	EPA 608	10103603	NELAP	PA
7690 - Heptachlor epoxide	EPA 608	10103603	NELAP	PA
8250 - Toxaphene (Chlorinated camphene)	EPA 608	10103603	NELAP	PA
7110 - alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	10103603	NELAP	PA
7115 - beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	10103603	NELAP	PA
7120 - gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	EPA 608	10103603	NELAP	PA
7075 - Azinphos-methyl (Guthion)	EPA 622	10106806	NELAP	PA
7125 - Bolstar (Sulprofos)	EPA 622	10106806	NELAP	PA
7220 - Carbophenothion	EPA 622	10106806	NELAP	PA
7300 - Chlorpyrifos	EPA 622	10106806	NELAP	PA
7315 - Coumaphos	EPA 622	10106806	NELAP	PA
7395 - Demeton-o	EPA 622	10106806	NELAP	PA
7385 - Demeton-s	EPA 622	10106806	NELAP	PA
7410 - Diazinon	EPA 622	10106806	NELAP	PA
8610 - Dichlorovos (DDVP, Dichlorvos)	EPA 622	10106806	NELAP	PA
7495 - Dioxathion	EPA 622	10106806	NELAP	PA
8625 - Disulfoton	EPA 622	10106806	NELAP	PA
7550 - EPN	EPA 622	10106806	NELAP	PA
7565 - Ethion	EPA 622	10106806	NELAP	PA
7570 - Ethoprop	EPA 622	10106806	NELAP	PA
7580 - Famphur	EPA 622	10106806	NELAP	PA
7600 - Fensulfothion	EPA 622	10106806	NELAP	PA
7605 - Fenthion	EPA 622	10106806	NELAP	PA
7640 - Fonophos (Fonofos)	EPA 622	10106806	NELAP	PA
7770 - Malathion	EPA 622	10106806	NELAP	PA
7785 - Merphos	EPA 622	10106806	NELAP	PA
7795 - Methamidophos	EPA 622	10106806	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 622	10106806	NELAP	PA
7850 - Mevinphos	EPA 622	10106806	NELAP	PA
7880 - Monocrotophos	EPA 622	10106806	NELAP	PA
7905 - Naled	EPA 622	10106806	NELAP	PA
7955 - Parathion, ethyl	EPA 622	10106806	NELAP	PA
7985 - Phorate	EPA 622	10106806	NELAP	PA
8000 - Phosmet (Imidan)	EPA 622	10106806	NELAP	PA
8110 - Ronnel	EPA 622	10106806	NELAP	PA
8140 - Stirophos	EPA 622	10106806	NELAP	PA
8185 - Terbufos	EPA 622	10106806	NELAP	PA
8245 - Tokuthion (Prothiophos)	EPA 622	10106806	NELAP	PA
8275 - Trichloronate	EPA 622	10106806	NELAP	PA
5160 - 1,1,1-Trichloroethane	EPA 624	10107207	NELAP	PA
5110 - 1,1,2,2-Tetrachloroethane	EPA 624	10107207	NELAP	PA
5165 - 1,1,2-Trichloroethane	EPA 624	10107207	NELAP	PA
4630 - 1,1-Dichloroethane	EPA 624	10107207	NELAP	PA
4640 - 1,1-Dichloroethylene	EPA 624	10107207	NELAP	PA
4670 - 1,1-Dichloropropene	EPA 624	10107207	NELAP	PA
5150 - 1,2,3-Trichlorobenzene	EPA 624	10107207	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 624	10107207	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA 624	10107207	NELAP	PA
4655 - 1,2-Dichloropropane	EPA 624	10107207	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 624	10107207	NELAP	PA
4660 - 1,3-Dichloropropane	EPA 624	10107207	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 624	10107207	NELAP	PA
4480 - 1-Chlorobutane	EPA 624	10107207	NELAP	PA
4665 - 2,2-Dichloropropane	EPA 624	10107207	NELAP	PA
4500 - 2-Chloroethyl vinyl ether	EPA 624	10107207	NELAP	PA
4535 - 2-Chlorotoluene	EPA 624	10107207	NELAP	PA
6412 - 3+4 Methylphenol	EPA 624	10107207	NELAP	PA
100256 - 3,4-dichloro-1-butene	EPA 624	10107207	NELAP	PA
4540 - 4-Chlorotoluene	EPA 624	10107207	NELAP	PA
4910 - 4-Isopropyltoluene (p-Cymene)	EPA 624	10107207	NELAP	PA
4325 - Acrolein (Propenal)	EPA 624	10107207	NELAP	PA
4340 - Acrylonitrile	EPA 624	10107207	NELAP	PA
4355 - Allyl chloride (3-Chloropropene)	EPA 624	10107207	NELAP	PA
4375 - Benzene	EPA 624	10107207	NELAP	PA
4385 - Bromobenzene	EPA 624	10107207	NELAP	PA
4390 - Bromochloromethane	EPA 624	10107207	NELAP	PA
4395 - Bromodichloromethane	EPA 624	10107207	NELAP	PA
4397 - Bromoethane (Ethyl Bromide)	EPA 624	10107207	NELAP	PA
4398 - Bromoethene	EPA 624	10107207	NELAP	PA
4400 - Bromoform	EPA 624	10107207	NELAP	PA
4455 - Carbon tetrachloride	EPA 624	10107207	NELAP	PA
4475 - Chlorobenzene	EPA 624	10107207	NELAP	PA
4485 - Chloroethane (Ethyl chloride)	EPA 624	10107207	NELAP	PA
4505 - Chloroform	EPA 624	10107207	NELAP	PA
9375 - Di-isopropylether (DIPE) (Isopropyl ether)	EPA 624	10107207	NELAP	PA
4595 - Dibromomethane (Methylene bromide)	EPA 624	10107207	NELAP	PA
4725 - Diethyl ether	EPA 624	10107207	NELAP	PA
4737 - Divinylbenzene (vinylstyrene)	EPA 624	10107207	NELAP	PA
4755 - Ethyl acetate	EPA 624	10107207	NELAP	PA
4810 - Ethyl methacrylate	EPA 624	10107207	NELAP	PA
4765 - Ethylbenzene	EPA 624	10107207	NELAP	PA
4840 - Hexachloroethane	EPA 624	10107207	NELAP	PA
4870 - Iodomethane (Methyl iodide)	EPA 624	10107207	NELAP	PA
4900 - Isopropylbenzene	EPA 624	10107207	NELAP	PA
4925 - Methacrylonitrile	EPA 624	10107207	NELAP	PA
4950 - Methyl bromide (Bromomethane)	EPA 624	10107207	NELAP	PA
4960 - Methyl chloride (Chloromethane)	EPA 624	10107207	NELAP	PA
4975 - Methylene chloride (Dichloromethane)	EPA 624	10107207	NELAP	PA
5035 - Pentachloroethane	EPA 624	10107207	NELAP	PA
5080 - Propionitrile (Ethyl cyanide)	EPA 624	10107207	NELAP	PA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA 624	10107207	NELAP	PA
5140 - Toluene	EPA 624	10107207	NELAP	PA
5170 - Trichloroethene (Trichloroethylene)	EPA 624	10107207	NELAP	PA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA 624	10107207	NELAP	PA
5235 - Vinyl chloride	EPA 624	10107207	NELAP	PA
5260 - Xylene (total)	EPA 624	10107207	NELAP	PA
4705 - cis & trans-1,2-Dichloroethene	EPA 624	10107207	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
100290 - cis & trans-1,3-Dichloropropylene	EPA 624	10107207	NELAP	PA
4680 - cis-1,3-Dichloropropene	EPA 624	10107207	NELAP	PA
4435 - n-Butylbenzene	EPA 624	10107207	NELAP	PA
4855 - n-Hexane	EPA 624	10107207	NELAP	PA
5090 - n-Propylbenzene	EPA 624	10107207	NELAP	PA
4440 - sec-Butylbenzene	EPA 624	10107207	NELAP	PA
4445 - tert-Butylbenzene	EPA 624	10107207	NELAP	PA
100544 - total 1,3-dichloropropene	EPA 624	10107207	NELAP	PA
4700 - trans-1,2-Dichloroethylene	EPA 624	10107207	NELAP	PA
4685 - trans-1,3-Dichloropropylene	EPA 624	10107207	NELAP	PA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 625	10107401	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 625	10107401	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 625	10107401	NELAP	PA
6220 - 1,2-Diphenylhydrazine	EPA 625	10107401	NELAP	PA
6800 - 1,3,5-Trichlorobenzene	EPA 625	10107401	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 625	10107401	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 625	10107401	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 625	10107401	NELAP	PA
6165 - 1,4-Dinitrobenzene	EPA 625	10107401	NELAP	PA
5790 - 1-Chloronaphthalene	EPA 625	10107401	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 625	10107401	NELAP	PA
9501 - 1-Methylphenanthrene	EPA 625	10107401	NELAP	PA
6735 - 2,3,4,6-Tetrachlorophenol	EPA 625	10107401	NELAP	PA
9363 - 2,3-Dichloroaniline	EPA 625	10107401	NELAP	PA
5983 - 2,3-Dichlorophenol	EPA 625	10107401	NELAP	PA
6835 - 2,4,5-Trichlorophenol	EPA 625	10107401	NELAP	PA
6840 - 2,4,6-Trichlorophenol	EPA 625	10107401	NELAP	PA
6000 - 2,4-Dichlorophenol	EPA 625	10107401	NELAP	PA
6130 - 2,4-Dimethylphenol	EPA 625	10107401	NELAP	PA
6175 - 2,4-Dinitrophenol	EPA 625	10107401	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 625	10107401	NELAP	PA
5992 - 2,5-Dichlorophenol	EPA 625	10107401	NELAP	PA
6005 - 2,6-Dichlorophenol	EPA 625	10107401	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 625	10107401	NELAP	PA
9322 - 2-Butoxyethanol	EPA 625	10107401	NELAP	PA
5795 - 2-Chloronaphthalene	EPA 625	10107401	NELAP	PA
5800 - 2-Chlorophenol	EPA 625	10107401	NELAP	PA
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	EPA 625	10107401	NELAP	PA
6400 - 2-Methylphenol (o-Cresol)	EPA 625	10107401	NELAP	PA
6460 - 2-Nitroaniline	EPA 625	10107401	NELAP	PA
6490 - 2-Nitrophenol	EPA 625	10107401	NELAP	PA
6412 - 3+4 Methylphenol	EPA 625	10107401	NELAP	PA
5945 - 3,3'-Dichlorobenzidine	EPA 625	10107401	NELAP	PA
5997 - 3,4-Dichlorophenol	EPA 625	10107401	NELAP	PA
6397 - 3,5-Dichlorophenol	EPA 625	10107401	NELAP	PA
6405 - 3-Methylphenol (m-Cresol)	EPA 625	10107401	NELAP	PA
6465 - 3-Nitroaniline	EPA 625	10107401	NELAP	PA
6495 - 3-Nitrophenol	EPA 625	10107401	NELAP	PA
7355 - 4,4'-DDD	EPA 625	10107401	NELAP	PA
7360 - 4,4'-DDE	EPA 625	10107401	NELAP	PA
7365 - 4,4'-DDT	EPA 625	10107401	NELAP	PA
5660 - 4-Bromophenyl phenyl ether	EPA 625	10107401	NELAP	PA
5700 - 4-Chloro-3-methylphenol	EPA 625	10107401	NELAP	PA
5745 - 4-Chloroaniline	EPA 625	10107401	NELAP	PA
5825 - 4-Chlorophenyl phenylether	EPA 625	10107401	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
6410 - 4-Methylphenol (p-Cresol)	EPA 625	10107401	NELAP	PA
6470 - 4-Nitroaniline	EPA 625	10107401	NELAP	PA
6500 - 4-Nitrophenol	EPA 625	10107401	NELAP	PA
5500 - Acenaphthene	EPA 625	10107401	NELAP	PA
5505 - Acenaphthylene	EPA 625	10107401	NELAP	PA
5510 - Acetophenone	EPA 625	10107401	NELAP	PA
7025 - Aldrin	EPA 625	10107401	NELAP	PA
5545 - Aniline	EPA 625	10107401	NELAP	PA
5555 - Anthracene	EPA 625	10107401	NELAP	PA
8880 - Aroclor-1016 (PCB-1016)	EPA 625	10107401	NELAP	PA
8885 - Aroclor-1221 (PCB-1221)	EPA 625	10107401	NELAP	PA
8890 - Aroclor-1232 (PCB-1232)	EPA 625	10107401	NELAP	PA
8895 - Aroclor-1242 (PCB-1242)	EPA 625	10107401	NELAP	PA
8900 - Aroclor-1248 (PCB-1248)	EPA 625	10107401	NELAP	PA
8905 - Aroclor-1254 (PCB-1254)	EPA 625	10107401	NELAP	PA
8910 - Aroclor-1260 (PCB-1260)	EPA 625	10107401	NELAP	PA
7075 - Azinphos-methyl (Guthion)	EPA 625	10107401	NELAP	PA
5562 - Azobenzene	EPA 625	10107401	NELAP	PA
5595 - Benzidine	EPA 625	10107401	NELAP	PA
5575 - Benzo(a)anthracene	EPA 625	10107401	NELAP	PA
5580 - Benzo(a)pyrene	EPA 625	10107401	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 625	10107401	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 625	10107401	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 625	10107401	NELAP	PA
5610 - Benzoic acid	EPA 625	10107401	NELAP	PA
5630 - Benzyl alcohol	EPA 625	10107401	NELAP	PA
5670 - Butyl benzyl phthalate	EPA 625	10107401	NELAP	PA
5680 - Carbazole	EPA 625	10107401	NELAP	PA
7220 - Carbophenothion	EPA 625	10107401	NELAP	PA
7250 - Chlordane (tech.)	EPA 625	10107401	NELAP	PA
7300 - Chlorpyrifos	EPA 625	10107401	NELAP	PA
5855 - Chrysene	EPA 625	10107401	NELAP	PA
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	EPA 625	10107401	NELAP	LA
5925 - Di-n-butyl phthalate	EPA 625	10107401	NELAP	PA
6200 - Di-n-octyl phthalate	EPA 625	10107401	NELAP	PA
7410 - Diazinon	EPA 625	10107401	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 625	10107401	NELAP	PA
5905 - Dibenzofuran	EPA 625	10107401	NELAP	PA
8610 - Dichlorovos (DDVP, Dichlorvos)	EPA 625	10107401	NELAP	PA
7470 - Dieldrin	EPA 625	10107401	NELAP	PA
6070 - Diethyl phthalate	EPA 625	10107401	NELAP	PA
6135 - Dimethyl phthalate	EPA 625	10107401	NELAP	PA
7495 - Dioxathion	EPA 625	10107401	NELAP	PA
6205 - Diphenylamine	EPA 625	10107401	NELAP	PA
8625 - Disulfoton	EPA 625	10107401	NELAP	PA
7550 - EPN	EPA 625	10107401	NELAP	PA
7510 - Endosulfan I	EPA 625	10107401	NELAP	PA
7515 - Endosulfan II	EPA 625	10107401	NELAP	PA
7520 - Endosulfan sulfate	EPA 625	10107401	NELAP	PA
7540 - Endrin	EPA 625	10107401	NELAP	PA
7530 - Endrin aldehyde	EPA 625	10107401	NELAP	PA
7535 - Endrin ketone	EPA 625	10107401	NELAP	PA
7565 - Ethion	EPA 625	10107401	NELAP	PA
7570 - Ethoprop	EPA 625	10107401	NELAP	PA
4769 - Ethylene glycol dimethacrylate	EPA 625	10107401	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
7580 - Famphur	EPA 625	10107401	NELAP	PA
6265 - Fluoranthene	EPA 625	10107401	NELAP	PA
6270 - Fluorene	EPA 625	10107401	NELAP	PA
7640 - Fonophos (Fonofos)	EPA 625	10107401	NELAP	PA
7685 - Heptachlor	EPA 625	10107401	NELAP	PA
7690 - Heptachlor epoxide	EPA 625	10107401	NELAP	PA
6275 - Hexachlorobenzene	EPA 625	10107401	NELAP	PA
4835 - Hexachlorobutadiene	EPA 625	10107401	NELAP	PA
6285 - Hexachlorocyclopentadiene	EPA 625	10107401	NELAP	PA
4840 - Hexachloroethane	EPA 625	10107401	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 625	10107401	NELAP	PA
6320 - Isophorone	EPA 625	10107401	NELAP	PA
7770 - Malathion	EPA 625	10107401	NELAP	PA
7810 - Methoxychlor	EPA 625	10107401	NELAP	PA
7880 - Monocrotophos	EPA 625	10107401	NELAP	PA
5005 - Naphthalene	EPA 625	10107401	NELAP	PA
5015 - Nitrobenzene	EPA 625	10107401	NELAP	PA
6590 - Pentachlorobenzene	EPA 625	10107401	NELAP	PA
6605 - Pentachlorophenol	EPA 625	10107401	NELAP	PA
6615 - Phenanthrene	EPA 625	10107401	NELAP	PA
6625 - Phenol	EPA 625	10107401	NELAP	PA
7985 - Phorate	EPA 625	10107401	NELAP	PA
8000 - Phosmet (Imidan)	EPA 625	10107401	NELAP	PA
6665 - Pyrene	EPA 625	10107401	NELAP	PA
5095 - Pyridine	EPA 625	10107401	NELAP	PA
8185 - Terbufos	EPA 625	10107401	NELAP	PA
9662 - Total Tetrachlorobenzenes	EPA 625	10107401	NELAP	PA
1940 - Total residual chlorine	EPA 625	10107401	NELAP	PA
8250 - Toxaphene (Chlorinated camphene)	EPA 625	10107401	NELAP	PA
7110 - alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 625	10107401	NELAP	PA
7240 - alpha-Chlordane	EPA 625	10107401	NELAP	PA
7115 - beta-BHC (beta-Hexachlorocyclohexane)	EPA 625	10107401	NELAP	PA
5760 - bis(2-Chloroethoxy)methane	EPA 625	10107401	NELAP	PA
5765 - bis(2-Chloroethyl) ether	EPA 625	10107401	NELAP	PA
5780 - bis(2-Chloroisopropyl) ether	EPA 625	10107401	NELAP	PA
6245 - bis(2-Ethoxyethyl) phthalate	EPA 625	10107401	NELAP	PA
6062 - bis(2-Ethylhexyl)adipate	EPA 625	10107401	NELAP	PA
6350 - bis(2-Methoxyethyl) phthalate	EPA 625	10107401	NELAP	PA
7105 - delta-BHC	EPA 625	10107401	NELAP	PA
7120 - gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 625	10107401	NELAP	PA
7245 - gamma-Chlordane	EPA 625	10107401	NELAP	PA
100149 - m+p chlorophenols	EPA 625	10107401	NELAP	PA
5875 - n-Decane	EPA 625	10107401	NELAP	PA
6545 - n-Nitrosodi-n-propylamine	EPA 625	10107401	NELAP	PA
6530 - n-Nitrosodimethylamine	EPA 625	10107401	NELAP	PA
6535 - n-Nitrosodiphenylamine	EPA 625	10107401	NELAP	PA
6565 - n-Nitrosopyrrolidine	EPA 625	10107401	NELAP	PA
6580 - n-Octadecane	EPA 625	10107401	NELAP	PA
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 1613B	10120602	NELAP	PA
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 1613B	10120602	NELAP	PA
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-	EPA 1613B	10120602	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
dioxin (1,2,3,4,6,7,8-hpcdd)				
9420 - 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	EPA 1613B	10120602	NELAP	PA
9423 - 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	EPA 1613B	10120602	NELAP	PA
9453 - 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	EPA 1613B	10120602	NELAP	PA
9471 - 1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	EPA 1613B	10120602	NELAP	PA
9456 - 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	EPA 1613B	10120602	NELAP	PA
9474 - 1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	EPA 1613B	10120602	NELAP	PA
9459 - 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	EPA 1613B	10120602	NELAP	PA
9477 - 1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	EPA 1613B	10120602	NELAP	PA
9540 - 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	EPA 1613B	10120602	NELAP	PA
9543 - 1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	EPA 1613B	10120602	NELAP	PA
9480 - 2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 1613B	10120602	NELAP	PA
9549 - 2,3,4,7,8-Pentachlorodibenzofuran	EPA 1613B	10120602	NELAP	PA
9612 - 2,3,7,8-Tetrachlorodibenzofuran	EPA 1613B	10120602	NELAP	PA
9438 - Total Hpcdd	EPA 1613B	10120602	NELAP	PA
9444 - Total Hpcdf	EPA 1613B	10120602	NELAP	PA
9468 - Total Hxcdd	EPA 1613B	10120602	NELAP	PA
9483 - Total Hxcdf	EPA 1613B	10120602	NELAP	PA
9555 - Total Pecdd	EPA 1613B	10120602	NELAP	PA
9552 - Total Pecdf	EPA 1613B	10120602	NELAP	PA
9609 - Total TCDD	EPA 1613B	10120602	NELAP	PA
9615 - Total TCDF	EPA 1613B	10120602	NELAP	PA
1860 - Oil & Grease	EPA 1664A	10127409	NELAP	PA
1860 - Oil & Grease	EPA 1664A (HEM)	10127807	NELAP	PA
2050 - Total Petroleum Hydrocarbons (TPH)	EPA 1664A (HEM)	10127807	NELAP	PA
8954 - 2,2',3,3'+2,3',4',6-Tetrachlorobiphenyl (BZ-40+71)	EPA 1668	10129201	NELAP	PA
8919 - 2,2',3,3',4,4'+2,3,4,4',5,6-Hexachlorobiphenyl (BZ-128+166)	EPA 1668	10129201	NELAP	PA
9105 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl (BZ-209)	EPA 1668	10129201	NELAP	PA
9095 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	EPA 1668	10129201	NELAP	PA
9090 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	EPA 1668	10129201	NELAP	PA
9102 - 2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	EPA 1668	10129201	NELAP	PA
9101 - 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	EPA 1668	10129201	NELAP	PA
9103 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	EPA 1668	10129201	NELAP	PA
9065 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	EPA 1668	10129201	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
8916 - 2,2',3,3',4,4',6+2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-171+173)	EPA 1668	10129201	NELAP	PA
9104 - 2,2',3,3',4,4',6,6'-Octachlorobiphenyl (BZ-197)	EPA 1668	10129201	NELAP	PA
9106 - 2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ-171)	EPA 1668	10129201	NELAP	PA
9020 - 2,2',3,3',4,4'-Hexachlorobiphenyl (BZ-128)	EPA 1668	10129201	NELAP	PA
9114 - 2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ-177)	EPA 1668	10129201	NELAP	PA
9112 - 2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ-201)	EPA 1668	10129201	NELAP	PA
9115 - 2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	EPA 1668	10129201	NELAP	PA
9117 - 2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	EPA 1668	10129201	NELAP	PA
8922 - 2,2',3,3',4,5+2,2',3,4,4',5'+2,3,3',4',5,6-Hexachlorobiphenyl (BZ-129+138+163)	EPA 1668	10129201	NELAP	PA
9108 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-199)	EPA 1668	10129201	NELAP	PA
8934 - 2,2',3,3',4,5,5',6+2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-198+199)	EPA 1668	10129201	NELAP	PA
9107 - 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	EPA 1668	10129201	NELAP	PA
9110 - 2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	EPA 1668	10129201	NELAP	PA
9116 - 2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-174)	EPA 1668	10129201	NELAP	PA
9111 - 2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ-200)	EPA 1668	10129201	NELAP	PA
9113 - 2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-173)	EPA 1668	10129201	NELAP	PA
9118 - 2,2',3,3',4,5-Hexachlorobiphenyl (BZ-129)	EPA 1668	10129201	NELAP	PA
9120 - 2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	EPA 1668	10129201	NELAP	PA
9119 - 2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	EPA 1668	10129201	NELAP	PA
9121 - 2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	EPA 1668	10129201	NELAP	PA
9122 - 2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	EPA 1668	10129201	NELAP	PA
9123 - 2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	EPA 1668	10129201	NELAP	PA
9124 - 2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	EPA 1668	10129201	NELAP	PA
9125 - 2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	EPA 1668	10129201	NELAP	PA
8927 - 2,2',3,3',5,6'+2,2',3,5,5',6-Hexachlorobiphenyls (BZ 135+151)	EPA 1668	10129201	NELAP	PA
9127 - 2,2',3,3',5,6'-Hexachlorobiphenyl (BZ-135)	EPA 1668	10129201	NELAP	PA
9126 - 2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	EPA 1668	10129201	NELAP	PA
9128 - 2,2',3,3',5,6-Hexachlorobiphenyl	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
(BZ-134)				
9129 - 2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	EPA 1668	10129201	NELAP	PA
9130 - 2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	EPA 1668	10129201	NELAP	PA
9131 - 2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	EPA 1668	10129201	NELAP	PA
9132 - 2,2',3,3'-Tetrachlorobiphenyl (BZ-40)	EPA 1668	10129201	NELAP	PA
9151 - 2,2',3,4',5',6-Hexachlorobiphenyl (BZ-149)	EPA 1668	10129201	NELAP	PA
9154 - 2,2',3,4',5'-Pentachlorobiphenyl (BZ-97)	EPA 1668	10129201	NELAP	PA
8948 - 2,2',3,4',5+2,2',4,5,5'+2,3,3',5',6-Pentachlorobiphenyl (BZ-90+101+113)	EPA 1668	10129201	NELAP	PA
9080 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (BZ-187)	EPA 1668	10129201	NELAP	PA
9144 - 2,2',3,4',5,5'-Hexachlorobiphenyl (BZ-146)	EPA 1668	10129201	NELAP	PA
9147 - 2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	EPA 1668	10129201	NELAP	PA
8929 - 2,2',3,4',5,6+2,2',3,4',5',6-Hexachlorobiphenyl (BZ-147+149)	EPA 1668	10129201	NELAP	PA
9146 - 2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	EPA 1668	10129201	NELAP	PA
9149 - 2,2',3,4',5,6-Hexachlorobiphenyl (BZ-147)	EPA 1668	10129201	NELAP	PA
9155 - 2,2',3,4',5-Pentachlorobiphenyl (BZ-90)	EPA 1668	10129201	NELAP	PA
9159 - 2,2',3,4',6'-Pentachlorobiphenyl (BZ-98)	EPA 1668	10129201	NELAP	PA
9157 - 2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	EPA 1668	10129201	NELAP	PA
9160 - 2,2',3,4',6-Pentachlorobiphenyl (BZ-91)	EPA 1668	10129201	NELAP	PA
9162 - 2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	EPA 1668	10129201	NELAP	PA
8942 - 2,2',3,4,4'+2,3,4,5,6-Pentachlorobiphenyl (BZ-85+116)	EPA 1668	10129201	NELAP	PA
9075 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (BZ-183)	EPA 1668	10129201	NELAP	PA
9025 - 2,2',3,4,4',5'-Hexachlorobiphenyl (BZ-138)	EPA 1668	10129201	NELAP	PA
8917 - 2,2',3,4,4',5,5'+2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-180+193)	EPA 1668	10129201	NELAP	PA
9133 - 2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	EPA 1668	10129201	NELAP	PA
9134 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ-180)	EPA 1668	10129201	NELAP	PA
9136 - 2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	EPA 1668	10129201	NELAP	PA
9135 - 2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	EPA 1668	10129201	NELAP	PA
9137 - 2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	EPA 1668	10129201	NELAP	PA
9138 - 2,2',3,4,4',5-Hexachlorobiphenyl	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
(BZ-137)				
9140 - 2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-140)	EPA 1668	10129201	NELAP	PA
8928 - 2,2',3,4,4',6+2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-139+140)	EPA 1668	10129201	NELAP	PA
9139 - 2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	EPA 1668	10129201	NELAP	PA
9141 - 2,2',3,4,4',6-Hexachlorobiphenyl (BZ-139)	EPA 1668	10129201	NELAP	PA
9142 - 2,2',3,4,4'-Pentachlorobiphenyl (BZ-85)	EPA 1668	10129201	NELAP	PA
9150 - 2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	EPA 1668	10129201	NELAP	PA
8975 - 2,2',3,4,5'-Pentachlorobiphenyl (BZ-87)	EPA 1668	10129201	NELAP	PA
8946 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,3,3',4,5'+2,3',4,4'6+2,3',4',5'6-Pentachlorobiphenyl (BZ 86+87+97+108+119+125)	EPA 1668	10129201	NELAP	PA
9143 - 2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-185)	EPA 1668	10129201	NELAP	PA
9030 - 2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	EPA 1668	10129201	NELAP	PA
9152 - 2,2',3,4,5,6'-Hexachlorobiphenyl (BZ-143)	EPA 1668	10129201	NELAP	PA
9145 - 2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	EPA 1668	10129201	NELAP	PA
9148 - 2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	EPA 1668	10129201	NELAP	PA
9153 - 2,2',3,4,5-Pentachlorobiphenyl (BZ-86)	EPA 1668	10129201	NELAP	PA
9161 - 2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	EPA 1668	10129201	NELAP	PA
9156 - 2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	EPA 1668	10129201	NELAP	PA
9158 - 2,2',3,4,6-Pentachlorobiphenyl (BZ-88)	EPA 1668	10129201	NELAP	PA
9163 - 2,2',3,4-Tetrachlorobiphenyl (BZ-41)	EPA 1668	10129201	NELAP	PA
8957 - 2,2',3,5'+2,2',4,4'+2,3,5,6-Tetrachlorobiphenyl (BZ-44+47+65)	EPA 1668	10129201	NELAP	PA
9166 - 2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	EPA 1668	10129201	NELAP	PA
8945 - 2,2',3,5'-Tetrachlorobiphenyl (BZ-44)	EPA 1668	10129201	NELAP	PA
9035 - 2,2',3,5,5',6-Hexachlorobiphenyl (BZ-151)	EPA 1668	10129201	NELAP	PA
9164 - 2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	EPA 1668	10129201	NELAP	PA
9167 - 2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	EPA 1668	10129201	NELAP	PA
8949 - 2,2',3,5,6+2,2',4,4',6-Pentachlorobiphenyl (BZ-93+100)	EPA 1668	10129201	NELAP	PA
9165 - 2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	EPA 1668	10129201	NELAP	PA
9168 - 2,2',3,5,6-Pentachlorobiphenyl (BZ-	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
93)				
9169 - 2,2',3,5-Tetrachlorobiphenyl (BZ-43)	EPA 1668	10129201	NELAP	PA
9171 - 2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	EPA 1668	10129201	NELAP	PA
9170 - 2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	EPA 1668	10129201	NELAP	PA
9172 - 2,2',3,6-Tetrachlorobiphenyl (BZ-45)	EPA 1668	10129201	NELAP	PA
9173 - 2,2',3-Trichlorobiphenyl (BZ-16)	EPA 1668	10129201	NELAP	PA
8931 - 2,2',4,4',5,5'+2,3',4,4',5',6-Hexachlorobiphenyl (BZ-153+168)	EPA 1668	10129201	NELAP	PA
9040 - 2,2',4,4',5,5'-Hexachlorobiphenyl (BZ-153)	EPA 1668	10129201	NELAP	PA
9174 - 2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	EPA 1668	10129201	NELAP	PA
9175 - 2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	EPA 1668	10129201	NELAP	PA
9176 - 2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	EPA 1668	10129201	NELAP	PA
9177 - 2,2',4,4',6-Pentachlorobiphenyl (BZ-100)	EPA 1668	10129201	NELAP	PA
9178 - 2,2',4,4'-Tetrachlorobiphenyl (BZ-47)	EPA 1668	10129201	NELAP	PA
8959 - 2,2',4,5'+2,3',4,6-Tetrachlorobiphenyl (BZ-49+69)	EPA 1668	10129201	NELAP	PA
9179 - 2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	EPA 1668	10129201	NELAP	PA
8950 - 2,2',4,5'-Tetrachlorobiphenyl (BZ-49)	EPA 1668	10129201	NELAP	PA
8980 - 2,2',4,5,5'-Pentachlorobiphenyl (BZ-101)	EPA 1668	10129201	NELAP	PA
9180 - 2,2',4,5,6'-Pentachlorobiphenyl (BZ-102)	EPA 1668	10129201	NELAP	PA
9181 - 2,2',4,5-Tetrachlorobiphenyl (BZ-48)	EPA 1668	10129201	NELAP	PA
9183 - 2,2',4,6'-Tetrachlorobiphenyl (BZ-51)	EPA 1668	10129201	NELAP	PA
8961 - 2,2',4,6+2,2',5,6'-Tetrachlorobiphenyl (BZ-50+53)	EPA 1668	10129201	NELAP	PA
9182 - 2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	EPA 1668	10129201	NELAP	PA
9184 - 2,2',4,6-Tetrachlorobiphenyl (BZ-50)	EPA 1668	10129201	NELAP	PA
9185 - 2,2',4-Trichlorobiphenyl (BZ-17)	EPA 1668	10129201	NELAP	PA
8966 - 2,2',5+2,4,6-Trichlorobiphenyl (BZ-18+30)	EPA 1668	10129201	NELAP	PA
8955 - 2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	EPA 1668	10129201	NELAP	PA
9186 - 2,2',5,6'-Tetrachlorobiphenyl (BZ-53)	EPA 1668	10129201	NELAP	PA
8930 - 2,2',5-Trichlorobiphenyl (BZ-18)	EPA 1668	10129201	NELAP	PA
9187 - 2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	EPA 1668	10129201	NELAP	PA
9188 - 2,2',6-Trichlorobiphenyl (BZ-19)	EPA 1668	10129201	NELAP	PA
9189 - 2,2'-Dichlorobiphenyl (BZ-4)	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
9224 - 2,3',4',5',6-Pentachlorobiphenyl (BZ-125)	EPA 1668	10129201	NELAP	PA
9229 - 2,3',4',5'-Tetrachlorobiphenyl (BZ-76)	EPA 1668	10129201	NELAP	PA
9222 - 2,3',4',5,5'-Pentachlorobiphenyl (BZ-124)	EPA 1668	10129201	NELAP	PA
9230 - 2,3',4',5-Tetrachlorobiphenyl (BZ-70)	EPA 1668	10129201	NELAP	PA
9237 - 2,3',4',6-Tetrachlorobiphenyl (BZ-71)	EPA 1668	10129201	NELAP	PA
9239 - 2,3',4'-Trichlorobiphenyl (BZ-33)	EPA 1668	10129201	NELAP	PA
9218 - 2,3',4,4',5',6-Hexachlorobiphenyl (BZ-168)	EPA 1668	10129201	NELAP	PA
9000 - 2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	EPA 1668	10129201	NELAP	PA
9055 - 2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	EPA 1668	10129201	NELAP	PA
8995 - 2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	EPA 1668	10129201	NELAP	PA
9220 - 2,3',4,4',6-Pentachlorobiphenyl (BZ-119)	EPA 1668	10129201	NELAP	PA
8960 - 2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	EPA 1668	10129201	NELAP	PA
9226 - 2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	EPA 1668	10129201	NELAP	PA
9231 - 2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	EPA 1668	10129201	NELAP	PA
9223 - 2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	EPA 1668	10129201	NELAP	PA
9232 - 2,3',4,5-Tetrachlorobiphenyl (BZ-67)	EPA 1668	10129201	NELAP	PA
9235 - 2,3',4,6-Tetrachlorobiphenyl (BZ-69)	EPA 1668	10129201	NELAP	PA
9240 - 2,3',4-Trichlorobiphenyl (BZ-25)	EPA 1668	10129201	NELAP	PA
9244 - 2,3',5',6-Tetrachlorobiphenyl (BZ-73)	EPA 1668	10129201	NELAP	PA
9246 - 2,3',5'-Trichlorobiphenyl (BZ-34)	EPA 1668	10129201	NELAP	PA
8969 - 2,3',5+2,4,5-Trichlorobiphenyl (BZ-26+29)	EPA 1668	10129201	NELAP	PA
9242 - 2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	EPA 1668	10129201	NELAP	PA
8935 - 2,3',5-Trichlorobiphenyl (BZ-26)	EPA 1668	10129201	NELAP	PA
9248 - 2,3',6-Trichlorobiphenyl (BZ-27)	EPA 1668	10129201	NELAP	PA
9249 - 2,3'-Dichlorobiphenyl (BZ-6)	EPA 1668	10129201	NELAP	PA
9201 - 2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	EPA 1668	10129201	NELAP	PA
9202 - 2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	EPA 1668	10129201	NELAP	PA
9195 - 2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-193)	EPA 1668	10129201	NELAP	PA
9197 - 2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	EPA 1668	10129201	NELAP	PA
9199 - 2,3,3',4',5,6-Hexachlorobiphenyl (BZ-163)	EPA 1668	10129201	NELAP	PA
9205 - 2,3,3',4',5-Pentachlorobiphenyl (BZ-107)	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
8990 - 2,3,3',4',6-Pentachlorobiphenyl (BZ-110)	EPA 1668	10129201	NELAP	PA
9207 - 2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	EPA 1668	10129201	NELAP	PA
9192 - 2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	EPA 1668	10129201	NELAP	PA
9045 - 2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	EPA 1668	10129201	NELAP	PA
8932 - 2,3,3',4,4',5+2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-156+157)	EPA 1668	10129201	NELAP	PA
9190 - 2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	EPA 1668	10129201	NELAP	PA
9085 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	EPA 1668	10129201	NELAP	PA
9191 - 2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	EPA 1668	10129201	NELAP	PA
9050 - 2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	EPA 1668	10129201	NELAP	PA
9193 - 2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	EPA 1668	10129201	NELAP	PA
8985 - 2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	EPA 1668	10129201	NELAP	PA
9200 - 2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	EPA 1668	10129201	NELAP	PA
9203 - 2,3,3',4,5'-Pentachlorobiphenyl (BZ-108)	EPA 1668	10129201	NELAP	PA
9194 - 2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ-192)	EPA 1668	10129201	NELAP	PA
9196 - 2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	EPA 1668	10129201	NELAP	PA
9198 - 2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	EPA 1668	10129201	NELAP	PA
9204 - 2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	EPA 1668	10129201	NELAP	PA
9206 - 2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	EPA 1668	10129201	NELAP	PA
9208 - 2,3,3',4-Tetrachlorobiphenyl (BZ-55)	EPA 1668	10129201	NELAP	PA
9212 - 2,3,3',5',6-Pentachlorobiphenyl (BZ-113)	EPA 1668	10129201	NELAP	PA
9213 - 2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	EPA 1668	10129201	NELAP	PA
9209 - 2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	EPA 1668	10129201	NELAP	PA
9210 - 2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	EPA 1668	10129201	NELAP	PA
9211 - 2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	EPA 1668	10129201	NELAP	PA
9214 - 2,3,3',5-Tetrachlorobiphenyl (BZ-57)	EPA 1668	10129201	NELAP	PA
9216 - 2,3,3'-Trichlorobiphenyl (BZ-20)	EPA 1668	10129201	NELAP	PA
9227 - 2,3,4',5,6-Pentachlorobiphenyl (BZ-117)	EPA 1668	10129201	NELAP	PA
9233 - 2,3,4',5-Tetrachlorobiphenyl (BZ-63)	EPA 1668	10129201	NELAP	PA
9236 - 2,3,4',6-Tetrachlorobiphenyl (BZ-	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
64)				
9241 - 2,3,4'-Trichlorobiphenyl (BZ-22)	EPA 1668	10129201	NELAP	PA
8968 - 2,3,4+2,3',4'-Trichlorobiphenyl (BZ-21+33)	EPA 1668	10129201	NELAP	PA
9217 - 2,3,4,4',5,6-Hexachlorobiphenyl (BZ-166)	EPA 1668	10129201	NELAP	PA
9005 - 2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	EPA 1668	10129201	NELAP	PA
9219 - 2,3,4,4',6-Pentachlorobiphenyl (BZ-115)	EPA 1668	10129201	NELAP	PA
9221 - 2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	EPA 1668	10129201	NELAP	PA
8963 - 2,3,4,5+2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyls (BZ 61+70+74+76)	EPA 1668	10129201	NELAP	PA
9225 - 2,3,4,5,6-Pentachlorobiphenyl (BZ-116)	EPA 1668	10129201	NELAP	PA
9228 - 2,3,4,5-Tetrachlorobiphenyl (BZ-61)	EPA 1668	10129201	NELAP	PA
9234 - 2,3,4,6-Tetrachlorobiphenyl (BZ-62)	EPA 1668	10129201	NELAP	PA
9238 - 2,3,4-Trichlorobiphenyl (BZ-21)	EPA 1668	10129201	NELAP	PA
9243 - 2,3,5,6-Tetrachlorobiphenyl (BZ-65)	EPA 1668	10129201	NELAP	PA
9245 - 2,3,5-Trichlorobiphenyl (BZ-23)	EPA 1668	10129201	NELAP	PA
6742 - 2,3,5-Trichlorophenol	EPA 1668	10129201	NELAP	PA
9247 - 2,3,6-Trichlorobiphenyl (BZ-24)	EPA 1668	10129201	NELAP	PA
8920 - 2,3-Dichlorobiphenyl (BZ-5)	EPA 1668	10129201	NELAP	PA
8940 - 2,4',5-Trichlorobiphenyl (BZ-31)	EPA 1668	10129201	NELAP	PA
9255 - 2,4',6-Trichlorobiphenyl (BZ-32)	EPA 1668	10129201	NELAP	PA
9256 - 2,4'-Dichlorobiphenyl (BZ-8)	EPA 1668	10129201	NELAP	PA
9250 - 2,4,4',5-Tetrachlorobiphenyl (BZ-74)	EPA 1668	10129201	NELAP	PA
9251 - 2,4,4',6-Tetrachlorobiphenyl (BZ-75)	EPA 1668	10129201	NELAP	PA
9252 - 2,4,4'-Trichlorobiphenyl (BZ-28)	EPA 1668	10129201	NELAP	PA
9253 - 2,4,5-Trichlorobiphenyl (BZ-29)	EPA 1668	10129201	NELAP	PA
9254 - 2,4,6-Trichlorobiphenyl (BZ-30)	EPA 1668	10129201	NELAP	PA
9257 - 2,4-Dichlorobiphenyl (BZ-7)	EPA 1668	10129201	NELAP	PA
9258 - 2,5-Dichlorobiphenyl (BZ-9)	EPA 1668	10129201	NELAP	PA
9259 - 2,6-Dichlorobiphenyl (BZ-10)	EPA 1668	10129201	NELAP	PA
8915 - 2-Chlorobiphenyl (BZ-1)	EPA 1668	10129201	NELAP	PA
9060 - 3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	EPA 1668	10129201	NELAP	PA
9015 - 3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	EPA 1668	10129201	NELAP	PA
8965 - 3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	EPA 1668	10129201	NELAP	PA
9261 - 3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	EPA 1668	10129201	NELAP	PA
9260 - 3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	EPA 1668	10129201	NELAP	PA
9262 - 3,3',4,5-Tetrachlorobiphenyl (BZ-78)	EPA 1668	10129201	NELAP	PA
9263 - 3,3',4-Trichlorobiphenyl (BZ-35)	EPA 1668	10129201	NELAP	PA
9264 - 3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	EPA 1668	10129201	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
9265 - 3,3',5-Trichlorobiphenyl (BZ-36)	EPA 1668	10129201	NELAP	PA
8925 - 3,3'-Dichlorobiphenyl (BZ-11)	EPA 1668	10129201	NELAP	PA
9268 - 3,4',5-Trichlorobiphenyl (BZ-39)	EPA 1668	10129201	NELAP	PA
9269 - 3,4'-Dichlorobiphenyl (BZ-13)	EPA 1668	10129201	NELAP	PA
100098 - 3,4+3,4'-Dichlorobiphenyl (BZ-12+13)	EPA 1668	10129201	NELAP	PA
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	EPA 1668	10129201	NELAP	PA
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	EPA 1668	10129201	NELAP	PA
9267 - 3,4,5-Trichlorobiphenyl (BZ-38)	EPA 1668	10129201	NELAP	PA
9270 - 3,4-Dichlorobiphenyl (BZ-12)	EPA 1668	10129201	NELAP	PA
9271 - 3,5-Dichlorobiphenyl (BZ-14)	EPA 1668	10129201	NELAP	PA
9272 - 3-Chlorobiphenyl (BZ-2)	EPA 1668	10129201	NELAP	PA
100368 - 3-Monochlorobiphenyl (BZ 2)	EPA 1668	10129201	NELAP	PA
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	EPA 1668	10129201	NELAP	PA
9274 - 4-Chlorobiphenyl (BZ-3)	EPA 1668	10129201	NELAP	PA
8954 - 2,2',3,3'+2,3',4',6-Tetrachlorobiphenyl (BZ-40+71)	EPA 1668A	10129405	NELAP	PA
8919 - 2,2',3,3',4,4'+2,3,4,4',5,6-Hexachlorobiphenyl (BZ-128+166)	EPA 1668A	10129405	NELAP	PA
9105 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl (BZ-209)	EPA 1668A	10129405	NELAP	PA
9095 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	EPA 1668A	10129405	NELAP	PA
9090 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	EPA 1668A	10129405	NELAP	PA
9102 - 2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	EPA 1668A	10129405	NELAP	PA
9101 - 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	EPA 1668A	10129405	NELAP	PA
9103 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	EPA 1668A	10129405	NELAP	PA
9065 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	EPA 1668A	10129405	NELAP	PA
8916 - 2,2',3,3',4,4',6+2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-171+173)	EPA 1668A	10129405	NELAP	PA
8933 - 2,2',3,3',4,4',6,6'+2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ 197+200)	EPA 1668A	10129405	NELAP	PA
9104 - 2,2',3,3',4,4',6,6'-Octachlorobiphenyl (BZ-197)	EPA 1668A	10129405	NELAP	PA
9106 - 2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ-171)	EPA 1668A	10129405	NELAP	PA
9020 - 2,2',3,3',4,4'-Hexachlorobiphenyl (BZ-128)	EPA 1668A	10129405	NELAP	PA
9114 - 2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ-177)	EPA 1668A	10129405	NELAP	PA
9112 - 2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ-201)	EPA 1668A	10129405	NELAP	PA
9115 - 2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	EPA 1668A	10129405	NELAP	PA
9117 - 2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	EPA 1668A	10129405	NELAP	PA
8922 - 2,2',3,3',4,5+2,2',3,4,4',5'+2,3,3',4',5,6-Hexachlorobiphenyl (BZ-129+138+163)	EPA 1668A	10129405	NELAP	PA
9108 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl	EPA 1668A	10129405	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
(BZ-199)				
8934 - 2,2',3,3',4,5,5',6+2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-198+199)	EPA 1668A	10129405	NELAP	PA
9107 - 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	EPA 1668A	10129405	NELAP	PA
9109 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl (BZ-198)	EPA 1668A	10129405	NELAP	PA
9110 - 2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	EPA 1668A	10129405	NELAP	PA
9116 - 2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-174)	EPA 1668A	10129405	NELAP	PA
9111 - 2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ-200)	EPA 1668A	10129405	NELAP	PA
9113 - 2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-173)	EPA 1668A	10129405	NELAP	PA
9118 - 2,2',3,3',4,5-Hexachlorobiphenyl (BZ-129)	EPA 1668A	10129405	NELAP	PA
9120 - 2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	EPA 1668A	10129405	NELAP	PA
9119 - 2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	EPA 1668A	10129405	NELAP	PA
9121 - 2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	EPA 1668A	10129405	NELAP	PA
9122 - 2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	EPA 1668A	10129405	NELAP	PA
9123 - 2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	EPA 1668A	10129405	NELAP	PA
9124 - 2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	EPA 1668A	10129405	NELAP	PA
9125 - 2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	EPA 1668A	10129405	NELAP	PA
8926 - 2,2',3,3',5,6'+2,2',3,5,5',6+2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-135+151+154)	EPA 1668A	10129405	NELAP	PA
9127 - 2,2',3,3',5,6'-Hexachlorobiphenyl (BZ-135)	EPA 1668A	10129405	NELAP	PA
9126 - 2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	EPA 1668A	10129405	NELAP	PA
9128 - 2,2',3,3',5,6-Hexachlorobiphenyl (BZ-134)	EPA 1668A	10129405	NELAP	PA
9129 - 2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	EPA 1668A	10129405	NELAP	PA
9130 - 2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	EPA 1668A	10129405	NELAP	PA
9131 - 2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	EPA 1668A	10129405	NELAP	PA
9132 - 2,2',3,3'-Tetrachlorobiphenyl (BZ-40)	EPA 1668A	10129405	NELAP	PA
9151 - 2,2',3,4',5',6-Hexachlorobiphenyl (BZ-149)	EPA 1668A	10129405	NELAP	PA
9154 - 2,2',3,4',5'-Pentachlorobiphenyl (BZ-97)	EPA 1668A	10129405	NELAP	PA
8948 - 2,2',3,4',5+2,2',4,5,5'+2,3,3',5',6-Pentachlorobiphenyl (BZ-90+101+113)	EPA 1668A	10129405	NELAP	PA
9080 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (BZ-187)	EPA 1668A	10129405	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
9144 - 2,2',3,4',5,5'-Hexachlorobiphenyl (BZ-146)	EPA 1668A	10129405	NELAP	PA
9147 - 2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	EPA 1668A	10129405	NELAP	PA
8929 - 2,2',3,4',5,6+2,2',3,4',5',6-Hexachlorobiphenyl (BZ-147+149)	EPA 1668A	10129405	NELAP	PA
9146 - 2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	EPA 1668A	10129405	NELAP	PA
9149 - 2,2',3,4',5,6-Hexachlorobiphenyl (BZ-147)	EPA 1668A	10129405	NELAP	PA
9155 - 2,2',3,4',5-Pentachlorobiphenyl (BZ-90)	EPA 1668A	10129405	NELAP	PA
8951 - 2,2',3,4',6'+2,2',4,5,6'-Pentachlorobiphenyl (BZ-98+102)	EPA 1668A	10129405	NELAP	PA
9159 - 2,2',3,4',6'-Pentachlorobiphenyl (BZ-98)	EPA 1668A	10129405	NELAP	PA
9157 - 2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	EPA 1668A	10129405	NELAP	PA
9160 - 2,2',3,4',6-Pentachlorobiphenyl (BZ-91)	EPA 1668A	10129405	NELAP	PA
9162 - 2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	EPA 1668A	10129405	NELAP	PA
8941 - 2,2',3,4,4'+2,3,4,5,6+2,3,4',5,6-Pentachlorobiphenyl (BZ-85+116+117)	EPA 1668A	10129405	NELAP	PA
8918 - 2,2',3,4,4',5',6+2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-183+185)	EPA 1668A	10129405	NELAP	PA
9075 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (BZ-183)	EPA 1668A	10129405	NELAP	PA
9025 - 2,2',3,4,4',5'-Hexachlorobiphenyl (BZ-138)	EPA 1668A	10129405	NELAP	PA
8917 - 2,2',3,4,4',5,5'+2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-180+193)	EPA 1668A	10129405	NELAP	PA
9133 - 2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	EPA 1668A	10129405	NELAP	PA
9134 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ-180)	EPA 1668A	10129405	NELAP	PA
9136 - 2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	EPA 1668A	10129405	NELAP	PA
9135 - 2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	EPA 1668A	10129405	NELAP	PA
9137 - 2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	EPA 1668A	10129405	NELAP	PA
9138 - 2,2',3,4,4',5-Hexachlorobiphenyl (BZ-137)	EPA 1668A	10129405	NELAP	PA
9140 - 2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-140)	EPA 1668A	10129405	NELAP	PA
8928 - 2,2',3,4,4',6+2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-139+140)	EPA 1668A	10129405	NELAP	PA
9139 - 2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	EPA 1668A	10129405	NELAP	PA
9141 - 2,2',3,4,4',6-Hexachlorobiphenyl (BZ-139)	EPA 1668A	10129405	NELAP	PA
9142 - 2,2',3,4,4'-Pentachlorobiphenyl (BZ-85)	EPA 1668A	10129405	NELAP	PA
9150 - 2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	EPA 1668A	10129405	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
8975 - 2,2',3,4,5'-Pentachlorobiphenyl (BZ-87)	EPA 1668A	10129405	NELAP	PA
8944 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,2',4,4',6-Pentachlorobiphenyl (BZ-86+87+97+100)	EPA 1668A	10129405	NELAP	PA
8946 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,3,3',4,5'+2,3',4,4'6+2,3',4',5'6-Pentachlorobiphenyl (BZ 86+87+97+108+119+125)	EPA 1668A	10129405	NELAP	PA
9143 - 2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-185)	EPA 1668A	10129405	NELAP	PA
9030 - 2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	EPA 1668A	10129405	NELAP	PA
9152 - 2,2',3,4,5,6'-Hexachlorobiphenyl (BZ-143)	EPA 1668A	10129405	NELAP	PA
9145 - 2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	EPA 1668A	10129405	NELAP	PA
9148 - 2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	EPA 1668A	10129405	NELAP	PA
9153 - 2,2',3,4,5-Pentachlorobiphenyl (BZ-86)	EPA 1668A	10129405	NELAP	PA
9161 - 2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	EPA 1668A	10129405	NELAP	PA
8947 - 2,2',3,4,6+2,2',3,4',6-Pentachlorobiphenyl (BZ-88+91)	EPA 1668A	10129405	NELAP	PA
9156 - 2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	EPA 1668A	10129405	NELAP	PA
9158 - 2,2',3,4,6-Pentachlorobiphenyl (BZ-88)	EPA 1668A	10129405	NELAP	PA
9163 - 2,2',3,4-Tetrachlorobiphenyl (BZ-41)	EPA 1668A	10129405	NELAP	PA
8957 - 2,2',3,5'+2,2',4,4'+2,3,5,6-Tetrachlorobiphenyl (BZ-44+47+65)	EPA 1668A	10129405	NELAP	PA
9166 - 2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	EPA 1668A	10129405	NELAP	PA
8945 - 2,2',3,5'-Tetrachlorobiphenyl (BZ-44)	EPA 1668A	10129405	NELAP	PA
8956 - 2,2',3,5+2,3',5',6-Tetrachlorobiphenyl (BZ-43+73)	EPA 1668A	10129405	NELAP	PA
9035 - 2,2',3,5,5',6-Hexachlorobiphenyl (BZ-151)	EPA 1668A	10129405	NELAP	PA
9164 - 2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	EPA 1668A	10129405	NELAP	PA
9167 - 2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	EPA 1668A	10129405	NELAP	PA
8949 - 2,2',3,5,6+2,2',4,4',6-Pentachlorobiphenyl (BZ-93+100)	EPA 1668A	10129405	NELAP	PA
9165 - 2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	EPA 1668A	10129405	NELAP	PA
9168 - 2,2',3,5,6-Pentachlorobiphenyl (BZ-93)	EPA 1668A	10129405	NELAP	PA
9169 - 2,2',3,5-Tetrachlorobiphenyl (BZ-43)	EPA 1668A	10129405	NELAP	PA
9171 - 2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	EPA 1668A	10129405	NELAP	PA
8958 - 2,2',3,6+2,2',4,6'-	EPA 1668A	10129405	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
Tetrachlorobiphenyls (BZ 45 + 51)				
9170 - 2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	EPA 1668A	10129405	NELAP	PA
9172 - 2,2',3,6-Tetrachlorobiphenyl (BZ-45)	EPA 1668A	10129405	NELAP	PA
9173 - 2,2',3-Trichlorobiphenyl (BZ-16)	EPA 1668A	10129405	NELAP	PA
8931 - 2,2',4,4',5,5'+2,3',4,4',5',6-Hexachlorobiphenyl (BZ-153+168)	EPA 1668A	10129405	NELAP	PA
9040 - 2,2',4,4',5,5'-Hexachlorobiphenyl (BZ-153)	EPA 1668A	10129405	NELAP	PA
9174 - 2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	EPA 1668A	10129405	NELAP	PA
9175 - 2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	EPA 1668A	10129405	NELAP	PA
9176 - 2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	EPA 1668A	10129405	NELAP	PA
9177 - 2,2',4,4',6-Pentachlorobiphenyl (BZ-100)	EPA 1668A	10129405	NELAP	PA
9178 - 2,2',4,4'-Tetrachlorobiphenyl (BZ-47)	EPA 1668A	10129405	NELAP	PA
8959 - 2,2',4,5'+2,3',4,6-Tetrachlorobiphenyl (BZ-49+69)	EPA 1668A	10129405	NELAP	PA
9179 - 2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	EPA 1668A	10129405	NELAP	PA
8950 - 2,2',4,5'-Tetrachlorobiphenyl (BZ-49)	EPA 1668A	10129405	NELAP	PA
8980 - 2,2',4,5,5'-Pentachlorobiphenyl (BZ-101)	EPA 1668A	10129405	NELAP	PA
9180 - 2,2',4,5,6'-Pentachlorobiphenyl (BZ-102)	EPA 1668A	10129405	NELAP	PA
9181 - 2,2',4,5-Tetrachlorobiphenyl (BZ-48)	EPA 1668A	10129405	NELAP	PA
9183 - 2,2',4,6'-Tetrachlorobiphenyl (BZ-51)	EPA 1668A	10129405	NELAP	PA
8961 - 2,2',4,6+2,2',5,6'-Tetrachlorobiphenyl (BZ-50+53)	EPA 1668A	10129405	NELAP	PA
9182 - 2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	EPA 1668A	10129405	NELAP	PA
9184 - 2,2',4,6-Tetrachlorobiphenyl (BZ-50)	EPA 1668A	10129405	NELAP	PA
9185 - 2,2',4-Trichlorobiphenyl (BZ-17)	EPA 1668A	10129405	NELAP	PA
8966 - 2,2',5+2,4,6-Trichlorobiphenyl (BZ-18+30)	EPA 1668A	10129405	NELAP	PA
8955 - 2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	EPA 1668A	10129405	NELAP	PA
9186 - 2,2',5,6'-Tetrachlorobiphenyl (BZ-53)	EPA 1668A	10129405	NELAP	PA
8930 - 2,2',5-Trichlorobiphenyl (BZ-18)	EPA 1668A	10129405	NELAP	PA
9187 - 2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	EPA 1668A	10129405	NELAP	PA
9188 - 2,2',6-Trichlorobiphenyl (BZ-19)	EPA 1668A	10129405	NELAP	PA
9189 - 2,2'-Dichlorobiphenyl (BZ-4)	EPA 1668A	10129405	NELAP	PA
9224 - 2,3',4',5',6-Pentachlorobiphenyl (BZ-125)	EPA 1668A	10129405	NELAP	PA
9229 - 2,3',4',5'-Tetrachlorobiphenyl (BZ-76)	EPA 1668A	10129405	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
8964 - 2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyl (BZ-70+74+76)	EPA 1668A	10129405	NELAP	PA
9222 - 2,3',4',5,5'-Pentachlorobiphenyl (BZ-124)	EPA 1668A	10129405	NELAP	PA
9230 - 2,3',4',5-Tetrachlorobiphenyl (BZ-70)	EPA 1668A	10129405	NELAP	PA
9237 - 2,3',4',6-Tetrachlorobiphenyl (BZ-71)	EPA 1668A	10129405	NELAP	PA
9239 - 2,3',4'-Trichlorobiphenyl (BZ-33)	EPA 1668A	10129405	NELAP	PA
9218 - 2,3',4,4',5',6-Hexachlorobiphenyl (BZ-168)	EPA 1668A	10129405	NELAP	PA
9000 - 2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	EPA 1668A	10129405	NELAP	PA
9055 - 2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	EPA 1668A	10129405	NELAP	PA
8995 - 2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	EPA 1668A	10129405	NELAP	PA
9220 - 2,3',4,4',6-Pentachlorobiphenyl (BZ-119)	EPA 1668A	10129405	NELAP	PA
8960 - 2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	EPA 1668A	10129405	NELAP	PA
9226 - 2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	EPA 1668A	10129405	NELAP	PA
9231 - 2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	EPA 1668A	10129405	NELAP	PA
9223 - 2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	EPA 1668A	10129405	NELAP	PA
9232 - 2,3',4,5-Tetrachlorobiphenyl (BZ-67)	EPA 1668A	10129405	NELAP	PA
9235 - 2,3',4,6-Tetrachlorobiphenyl (BZ-69)	EPA 1668A	10129405	NELAP	PA
9240 - 2,3',4-Trichlorobiphenyl (BZ-25)	EPA 1668A	10129405	NELAP	PA
9244 - 2,3',5',6-Tetrachlorobiphenyl (BZ-73)	EPA 1668A	10129405	NELAP	PA
9246 - 2,3',5'-Trichlorobiphenyl (BZ-34)	EPA 1668A	10129405	NELAP	PA
8969 - 2,3',5+2,4,5-Trichlorobiphenyl (BZ-26+29)	EPA 1668A	10129405	NELAP	PA
9242 - 2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	EPA 1668A	10129405	NELAP	PA
8935 - 2,3',5-Trichlorobiphenyl (BZ-26)	EPA 1668A	10129405	NELAP	PA
9248 - 2,3',6-Trichlorobiphenyl (BZ-27)	EPA 1668A	10129405	NELAP	PA
9249 - 2,3'-Dichlorobiphenyl (BZ-6)	EPA 1668A	10129405	NELAP	PA
8967 - 2,3,3'+2,4,4'-Trichlorobiphenyl (BZ-20+28)	EPA 1668A	10129405	NELAP	PA
9201 - 2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	EPA 1668A	10129405	NELAP	PA
9202 - 2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	EPA 1668A	10129405	NELAP	PA
8936 - 2,3,3',4',5+2,3',4',5,5'-Pentachlorobiphenyl (BZ-107+124)	EPA 1668A	10129405	NELAP	PA
9195 - 2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-193)	EPA 1668A	10129405	NELAP	PA
9197 - 2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	EPA 1668A	10129405	NELAP	PA
9199 - 2,3,3',4',5,6-Hexachlorobiphenyl (BZ-163)	EPA 1668A	10129405	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
9205 - 2,3,3',4',5-Pentachlorobiphenyl (BZ-107)	EPA 1668A	10129405	NELAP	PA
8938 - 2,3,3',4',6+2,3,4,4',6-Pentachlorobiphenyl (BZ-110+115)	EPA 1668A	10129405	NELAP	PA
8990 - 2,3,3',4',6-Pentachlorobiphenyl (BZ-110)	EPA 1668A	10129405	NELAP	PA
9207 - 2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	EPA 1668A	10129405	NELAP	PA
9192 - 2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	EPA 1668A	10129405	NELAP	PA
9045 - 2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	EPA 1668A	10129405	NELAP	PA
8932 - 2,3,3',4,4',5+2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-156+157)	EPA 1668A	10129405	NELAP	PA
9190 - 2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	EPA 1668A	10129405	NELAP	PA
9085 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	EPA 1668A	10129405	NELAP	PA
9191 - 2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	EPA 1668A	10129405	NELAP	PA
9050 - 2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	EPA 1668A	10129405	NELAP	PA
9193 - 2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	EPA 1668A	10129405	NELAP	PA
8985 - 2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	EPA 1668A	10129405	NELAP	PA
9200 - 2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	EPA 1668A	10129405	NELAP	PA
9203 - 2,3,3',4,5'-Pentachlorobiphenyl (BZ-108)	EPA 1668A	10129405	NELAP	PA
9194 - 2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ-192)	EPA 1668A	10129405	NELAP	PA
9196 - 2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	EPA 1668A	10129405	NELAP	PA
9198 - 2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	EPA 1668A	10129405	NELAP	PA
9204 - 2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	EPA 1668A	10129405	NELAP	PA
9206 - 2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	EPA 1668A	10129405	NELAP	PA
9208 - 2,3,3',4-Tetrachlorobiphenyl (BZ-55)	EPA 1668A	10129405	NELAP	PA
9212 - 2,3,3',5',6-Pentachlorobiphenyl (BZ-113)	EPA 1668A	10129405	NELAP	PA
9213 - 2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	EPA 1668A	10129405	NELAP	PA
9209 - 2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	EPA 1668A	10129405	NELAP	PA
9210 - 2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	EPA 1668A	10129405	NELAP	PA
9211 - 2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	EPA 1668A	10129405	NELAP	PA
9214 - 2,3,3',5-Tetrachlorobiphenyl (BZ-57)	EPA 1668A	10129405	NELAP	PA
8962 - 2,3,3',6+2,3,4,6+2,4,4',6-Tetrachlorobiphenyl (BZ-59+62+75)	EPA 1668A	10129405	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
9215 - 2,3,3',6-Tetrachlorobiphenyl (BZ-59)	EPA 1668A	10129405	NELAP	PA
9216 - 2,3,3'-Trichlorobiphenyl (BZ-20)	EPA 1668A	10129405	NELAP	PA
9227 - 2,3,4',5,6-Pentachlorobiphenyl (BZ-117)	EPA 1668A	10129405	NELAP	PA
9233 - 2,3,4',5-Tetrachlorobiphenyl (BZ-63)	EPA 1668A	10129405	NELAP	PA
9236 - 2,3,4',6-Tetrachlorobiphenyl (BZ-64)	EPA 1668A	10129405	NELAP	PA
9241 - 2,3,4'-Trichlorobiphenyl (BZ-22)	EPA 1668A	10129405	NELAP	PA
8968 - 2,3,4+2,3',4'-Trichlorobiphenyl (BZ-21+33)	EPA 1668A	10129405	NELAP	PA
9217 - 2,3,4,4',5,6-Hexachlorobiphenyl (BZ-166)	EPA 1668A	10129405	NELAP	PA
9005 - 2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	EPA 1668A	10129405	NELAP	PA
9219 - 2,3,4,4',6-Pentachlorobiphenyl (BZ-115)	EPA 1668A	10129405	NELAP	PA
9221 - 2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	EPA 1668A	10129405	NELAP	PA
8963 - 2,3,4,5+2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyls (BZ 61+70+74+76)	EPA 1668A	10129405	NELAP	PA
9225 - 2,3,4,5,6-Pentachlorobiphenyl (BZ-116)	EPA 1668A	10129405	NELAP	PA
9228 - 2,3,4,5-Tetrachlorobiphenyl (BZ-61)	EPA 1668A	10129405	NELAP	PA
9234 - 2,3,4,6-Tetrachlorobiphenyl (BZ-62)	EPA 1668A	10129405	NELAP	PA
9238 - 2,3,4-Trichlorobiphenyl (BZ-21)	EPA 1668A	10129405	NELAP	PA
9243 - 2,3,5,6-Tetrachlorobiphenyl (BZ-65)	EPA 1668A	10129405	NELAP	PA
9245 - 2,3,5-Trichlorobiphenyl (BZ-23)	EPA 1668A	10129405	NELAP	PA
9247 - 2,3,6-Trichlorobiphenyl (BZ-24)	EPA 1668A	10129405	NELAP	PA
8920 - 2,3-Dichlorobiphenyl (BZ-5)	EPA 1668A	10129405	NELAP	PA
8940 - 2,4',5-Trichlorobiphenyl (BZ-31)	EPA 1668A	10129405	NELAP	PA
9255 - 2,4',6-Trichlorobiphenyl (BZ-32)	EPA 1668A	10129405	NELAP	PA
9256 - 2,4'-Dichlorobiphenyl (BZ-8)	EPA 1668A	10129405	NELAP	PA
9250 - 2,4,4',5-Tetrachlorobiphenyl (BZ-74)	EPA 1668A	10129405	NELAP	PA
9251 - 2,4,4',6-Tetrachlorobiphenyl (BZ-75)	EPA 1668A	10129405	NELAP	PA
9252 - 2,4,4'-Trichlorobiphenyl (BZ-28)	EPA 1668A	10129405	NELAP	PA
9253 - 2,4,5-Trichlorobiphenyl (BZ-29)	EPA 1668A	10129405	NELAP	PA
9254 - 2,4,6-Trichlorobiphenyl (BZ-30)	EPA 1668A	10129405	NELAP	PA
9257 - 2,4-Dichlorobiphenyl (BZ-7)	EPA 1668A	10129405	NELAP	PA
9258 - 2,5-Dichlorobiphenyl (BZ-9)	EPA 1668A	10129405	NELAP	PA
9259 - 2,6-Dichlorobiphenyl (BZ-10)	EPA 1668A	10129405	NELAP	PA
8915 - 2-Chlorobiphenyl (BZ-1)	EPA 1668A	10129405	NELAP	PA
9060 - 3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	EPA 1668A	10129405	NELAP	PA
9015 - 3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	EPA 1668A	10129405	NELAP	PA
8965 - 3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	EPA 1668A	10129405	NELAP	PA
9261 - 3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	EPA 1668A	10129405	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
9260 - 3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	EPA 1668A	10129405	NELAP	PA
9262 - 3,3',4,5-Tetrachlorobiphenyl (BZ-78)	EPA 1668A	10129405	NELAP	PA
9263 - 3,3',4-Trichlorobiphenyl (BZ-35)	EPA 1668A	10129405	NELAP	PA
9264 - 3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	EPA 1668A	10129405	NELAP	PA
9265 - 3,3',5-Trichlorobiphenyl (BZ-36)	EPA 1668A	10129405	NELAP	PA
8925 - 3,3'-Dichlorobiphenyl (BZ-11)	EPA 1668A	10129405	NELAP	PA
9268 - 3,4',5-Trichlorobiphenyl (BZ-39)	EPA 1668A	10129405	NELAP	PA
9269 - 3,4'-Dichlorobiphenyl (BZ-13)	EPA 1668A	10129405	NELAP	PA
100098 - 3,4+3,4'-Dichlorobiphenyl (BZ-12+13)	EPA 1668A	10129405	NELAP	PA
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	EPA 1668A	10129405	NELAP	PA
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	EPA 1668A	10129405	NELAP	PA
9267 - 3,4,5-Trichlorobiphenyl (BZ-38)	EPA 1668A	10129405	NELAP	PA
9270 - 3,4-Dichlorobiphenyl (BZ-12)	EPA 1668A	10129405	NELAP	PA
9271 - 3,5-Dichlorobiphenyl (BZ-14)	EPA 1668A	10129405	NELAP	PA
9272 - 3-Chlorobiphenyl (BZ-2)	EPA 1668A	10129405	NELAP	PA
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	EPA 1668A	10129405	NELAP	PA
9274 - 4-Chlorobiphenyl (BZ-3)	EPA 1668A	10129405	NELAP	PA
8872 - PCB Aroclor Identification	EPA 1668A	10129405	NELAP	PA
8870 - PCBs	EPA 1668A	10129405	NELAP	PA
8875 - PCBs, as congeners	EPA 1668A	10129405	NELAP	PA
8876 - Total Dichlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8877 - Total Heptachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8888 - Total Hexachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8889 - Total Monochlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8891 - Total Nonachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8892 - Total Octachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8896 - Total Pentachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8893 - Total Tetrachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8894 - Total Trichlorobiphenyls	EPA 1668A	10129405	NELAP	PA
100003 - Acid Digestion of waters for Total Recoverable or Dissolved Metals	EPA 3005A	10133207	NELAP	PA
1401 - Acid Digestion of Aqueous samples and Extracts for Total Metals	EPA 3010	10133401	NELAP	PA
100004 - Acid Digestion of Aqueous samples and Extracts for Total Metals	EPA 3010A	10133605	NELAP	PA
100642 - Acid Digestion of Aqueous samples and Extracts for Total Metals (HNO3 only)	EPA 3020A	10134404	NELAP	PA
100005 - Acid Digestion of Aqueous samples and Extracts for Total Metals for Analysis by GFAA	EPA 3020A	10134404	NELAP	PA
1444 - Separatory Funnel Liquid-liquid extraction	EPA 3510C	10138202	NELAP	PA
1410 - Continuous Liquid-liquid extraction	EPA 3520	10138406	NELAP	PA
1406 - Purge and trap for aqueous phase samples	EPA 5030A	10153205	NELAP	PA
1000 - Aluminum	EPA 6010B	10155609	NELAP	PA
1005 - Antimony	EPA 6010B	10155609	NELAP	PA
1010 - Arsenic	EPA 6010B	10155609	NELAP	PA
1015 - Barium	EPA 6010B	10155609	NELAP	PA
1020 - Beryllium	EPA 6010B	10155609	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
1025 - Boron	EPA 6010B	10155609	NELAP	PA
1030 - Cadmium	EPA 6010B	10155609	NELAP	PA
1035 - Calcium	EPA 6010B	10155609	NELAP	PA
1040 - Chromium	EPA 6010B	10155609	NELAP	PA
1050 - Cobalt	EPA 6010B	10155609	NELAP	PA
1055 - Copper	EPA 6010B	10155609	NELAP	PA
1070 - Iron	EPA 6010B	10155609	NELAP	PA
1075 - Lead	EPA 6010B	10155609	NELAP	PA
1080 - Lithium	EPA 6010B	10155609	NELAP	PA
1085 - Magnesium	EPA 6010B	10155609	NELAP	PA
1090 - Manganese	EPA 6010B	10155609	NELAP	PA
1100 - Molybdenum	EPA 6010B	10155609	NELAP	PA
1105 - Nickel	EPA 6010B	10155609	NELAP	PA
1125 - Potassium	EPA 6010B	10155609	NELAP	PA
1140 - Selenium	EPA 6010B	10155609	NELAP	PA
1150 - Silver	EPA 6010B	10155609	NELAP	PA
1155 - Sodium	EPA 6010B	10155609	NELAP	PA
1160 - Strontium	EPA 6010B	10155609	NELAP	PA
1165 - Thallium	EPA 6010B	10155609	NELAP	PA
1175 - Tin	EPA 6010B	10155609	NELAP	PA
1180 - Titanium	EPA 6010B	10155609	NELAP	PA
1185 - Vanadium	EPA 6010B	10155609	NELAP	PA
1190 - Zinc	EPA 6010B	10155609	NELAP	PA
1000 - Aluminum	EPA 6010C	10155803	NELAP	PA
1005 - Antimony	EPA 6010C	10155803	NELAP	PA
1010 - Arsenic	EPA 6010C	10155803	NELAP	PA
1015 - Barium	EPA 6010C	10155803	NELAP	PA
1020 - Beryllium	EPA 6010C	10155803	NELAP	PA
1025 - Boron	EPA 6010C	10155803	NELAP	PA
1030 - Cadmium	EPA 6010C	10155803	NELAP	PA
1035 - Calcium	EPA 6010C	10155803	NELAP	PA
1040 - Chromium	EPA 6010C	10155803	NELAP	PA
1050 - Cobalt	EPA 6010C	10155803	NELAP	PA
1055 - Copper	EPA 6010C	10155803	NELAP	PA
1070 - Iron	EPA 6010C	10155803	NELAP	PA
1075 - Lead	EPA 6010C	10155803	NELAP	PA
1080 - Lithium	EPA 6010C	10155803	NELAP	PA
1085 - Magnesium	EPA 6010C	10155803	NELAP	PA
1090 - Manganese	EPA 6010C	10155803	NELAP	PA
1100 - Molybdenum	EPA 6010C	10155803	NELAP	PA
1105 - Nickel	EPA 6010C	10155803	NELAP	PA
1125 - Potassium	EPA 6010C	10155803	NELAP	PA
1140 - Selenium	EPA 6010C	10155803	NELAP	PA
1150 - Silver	EPA 6010C	10155803	NELAP	PA
1155 - Sodium	EPA 6010C	10155803	NELAP	PA
1160 - Strontium	EPA 6010C	10155803	NELAP	PA
2017 - Sulfur	EPA 6010C	10155803	NELAP	PA
1165 - Thallium	EPA 6010C	10155803	NELAP	PA
1175 - Tin	EPA 6010C	10155803	NELAP	PA
1180 - Titanium	EPA 6010C	10155803	NELAP	PA
1185 - Vanadium	EPA 6010C	10155803	NELAP	PA
1190 - Zinc	EPA 6010C	10155803	NELAP	PA
1000 - Aluminum	EPA 6020	10156000	NELAP	PA
1005 - Antimony	EPA 6020	10156000	NELAP	PA
1010 - Arsenic	EPA 6020	10156000	NELAP	PA
1015 - Barium	EPA 6020	10156000	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
1020 - Beryllium	EPA 6020	10156000	NELAP	PA
1025 - Boron	EPA 6020	10156000	NELAP	PA
1030 - Cadmium	EPA 6020	10156000	NELAP	PA
1035 - Calcium	EPA 6020	10156000	NELAP	PA
1055 - Copper	EPA 6020	10156000	NELAP	PA
1075 - Lead	EPA 6020	10156000	NELAP	PA
1085 - Magnesium	EPA 6020	10156000	NELAP	PA
1090 - Manganese	EPA 6020	10156000	NELAP	PA
1100 - Molybdenum	EPA 6020	10156000	NELAP	PA
1105 - Nickel	EPA 6020	10156000	NELAP	PA
1125 - Potassium	EPA 6020	10156000	NELAP	PA
1140 - Selenium	EPA 6020	10156000	NELAP	PA
1150 - Silver	EPA 6020	10156000	NELAP	PA
1155 - Sodium	EPA 6020	10156000	NELAP	PA
1160 - Strontium	EPA 6020	10156000	NELAP	PA
1165 - Thallium	EPA 6020	10156000	NELAP	PA
1175 - Tin	EPA 6020	10156000	NELAP	PA
1180 - Titanium	EPA 6020	10156000	NELAP	PA
1185 - Vanadium	EPA 6020	10156000	NELAP	PA
1040 - Chromium	EPA 6020	10156204	NELAP	PA
1050 - Cobalt	EPA 6020	10156204	NELAP	PA
1070 - Iron	EPA 6020	10156204	NELAP	PA
1190 - Zinc	EPA 6020	10156204	NELAP	PA
1000 - Aluminum	EPA 6020A	10156408	NELAP	PA
1005 - Antimony	EPA 6020A	10156408	NELAP	PA
1010 - Arsenic	EPA 6020A	10156408	NELAP	PA
1015 - Barium	EPA 6020A	10156408	NELAP	PA
1020 - Beryllium	EPA 6020A	10156408	NELAP	PA
1025 - Boron	EPA 6020A	10156408	NELAP	PA
1030 - Cadmium	EPA 6020A	10156408	NELAP	PA
1035 - Calcium	EPA 6020A	10156408	NELAP	PA
1040 - Chromium	EPA 6020A	10156408	NELAP	PA
1050 - Cobalt	EPA 6020A	10156408	NELAP	PA
1055 - Copper	EPA 6020A	10156408	NELAP	PA
1070 - Iron	EPA 6020A	10156408	NELAP	PA
1075 - Lead	EPA 6020A	10156408	NELAP	PA
1085 - Magnesium	EPA 6020A	10156408	NELAP	PA
1090 - Manganese	EPA 6020A	10156408	NELAP	PA
1100 - Molybdenum	EPA 6020A	10156408	NELAP	PA
1105 - Nickel	EPA 6020A	10156408	NELAP	PA
1125 - Potassium	EPA 6020A	10156408	NELAP	PA
1140 - Selenium	EPA 6020A	10156408	NELAP	PA
1150 - Silver	EPA 6020A	10156408	NELAP	PA
1155 - Sodium	EPA 6020A	10156408	NELAP	PA
1160 - Strontium	EPA 6020A	10156408	NELAP	PA
1165 - Thallium	EPA 6020A	10156408	NELAP	PA
1175 - Tin	EPA 6020A	10156408	NELAP	PA
1180 - Titanium	EPA 6020A	10156408	NELAP	PA
1185 - Vanadium	EPA 6020A	10156408	NELAP	PA
1190 - Zinc	EPA 6020A	10156408	NELAP	PA
1045 - Chromium VI	EPA 7196A	10162400	NELAP	PA
1045 - Chromium VI	EPA 7199	10163005	NELAP	PA
1095 - Mercury	EPA 7470A	10165807	NELAP	PA
4570 - 1,2-Dibromo-3-chloropropane (DBCP)	EPA 8011	10173009	NELAP	PA
4585 - 1,2-Dibromoethane (EDB, Ethylene	EPA 8011	10173009	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
dibromide)				
4750 - Ethanol	EPA 8015	10173203	NELAP	PA
4785 - Ethylene glycol	EPA 8015	10173203	NELAP	PA
4895 - Isopropyl alcohol (2-Propanol, Isopropanol)	EPA 8015	10173203	NELAP	PA
4930 - Methanol	EPA 8015	10173203	NELAP	PA
4420 - tert-Butyl alcohol	EPA 8015	10173203	NELAP	PA
9369 - Diesel range organics (DRO)	EPA 8015B	10173601	NELAP	PA
4720 - Diethylene glycol	EPA 8015B	10173601	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8015B	10173601	NELAP	PA
4875 - Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8015B	10173601	NELAP	PA
6657 - Propylene Glycol	EPA 8015B	10173601	NELAP	PA
4003 - Total Petroleum Hydrocarbons (Aviation Gasoline Range)	EPA 8015B	10173601	NELAP	PA
4004 - Total Petroleum Hydrocarbons (Jet Fuel Range)	EPA 8015B	10173601	NELAP	PA
9506 - Total Petroleum Hydrocarbons (Oil Range)	EPA 8015B	10173601	NELAP	PA
2050 - Total Petroleum Hydrocarbons (TPH)	EPA 8015B	10173601	NELAP	PA
9646 - Triethylene Glycol	EPA 8015B	10173601	NELAP	PA
4425 - n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8015B	10173601	NELAP	PA
5055 - n-Propanol (1-Propanol)	EPA 8015B	10173601	NELAP	PA
9369 - Diesel range organics (DRO)	EPA 8015C	10173805	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8015C	10173805	NELAP	PA
4875 - Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8015C	10173805	NELAP	PA
1935 - Total recoverable petroleum hydrocarbons (TRPH)	EPA 8015C	10173805	NELAP	PA
4425 - n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8015C	10173805	NELAP	PA
5055 - n-Propanol (1-Propanol)	EPA 8015C	10173805	NELAP	PA
4375 - Benzene	EPA 8021B	10174808	NELAP	PA
4765 - Ethylbenzene	EPA 8021B	10174808	NELAP	PA
4900 - Isopropylbenzene	EPA 8021B	10174808	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	EPA 8021B	10174808	NELAP	PA
5005 - Naphthalene	EPA 8021B	10174808	NELAP	PA
5140 - Toluene	EPA 8021B	10174808	NELAP	PA
5260 - Xylene (total)	EPA 8021B	10174808	NELAP	PA
5245 - m-Xylene	EPA 8021B	10174808	NELAP	PA
5250 - o-Xylene	EPA 8021B	10174808	NELAP	PA
5255 - p-Xylene	EPA 8021B	10174808	NELAP	PA
7740 - Kepone	EPA 8081A	10178606	NELAP	PA
7355 - 4,4'-DDD	EPA 8081B	10178800	NELAP	PA
7360 - 4,4'-DDE	EPA 8081B	10178800	NELAP	PA
7365 - 4,4'-DDT	EPA 8081B	10178800	NELAP	PA
7025 - Aldrin	EPA 8081B	10178800	NELAP	PA
7250 - Chlordane (tech.)	EPA 8081B	10178800	NELAP	PA
7470 - Dieldrin	EPA 8081B	10178800	NELAP	PA
7510 - Endosulfan I	EPA 8081B	10178800	NELAP	PA
7515 - Endosulfan II	EPA 8081B	10178800	NELAP	PA
7520 - Endosulfan sulfate	EPA 8081B	10178800	NELAP	PA
7540 - Endrin	EPA 8081B	10178800	NELAP	PA
7530 - Endrin aldehyde	EPA 8081B	10178800	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
7535 - Endrin ketone	EPA 8081B	10178800	NELAP	PA
7685 - Heptachlor	EPA 8081B	10178800	NELAP	PA
7690 - Heptachlor epoxide	EPA 8081B	10178800	NELAP	PA
7740 - Kepone	EPA 8081B	10178800	NELAP	PA
7810 - Methoxychlor	EPA 8081B	10178800	NELAP	PA
8250 - Toxaphene (Chlorinated camphene)	EPA 8081B	10178800	NELAP	PA
7110 - alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081B	10178800	NELAP	PA
7115 - beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081B	10178800	NELAP	PA
7105 - delta-BHC	EPA 8081B	10178800	NELAP	PA
7120 - gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	EPA 8081B	10178800	NELAP	PA
8880 - Aroclor-1016 (PCB-1016)	EPA 8082	10179007	NELAP	PA
8885 - Aroclor-1221 (PCB-1221)	EPA 8082	10179007	NELAP	PA
8890 - Aroclor-1232 (PCB-1232)	EPA 8082	10179007	NELAP	PA
8895 - Aroclor-1242 (PCB-1242)	EPA 8082	10179007	NELAP	PA
8900 - Aroclor-1248 (PCB-1248)	EPA 8082	10179007	NELAP	PA
8905 - Aroclor-1254 (PCB-1254)	EPA 8082	10179007	NELAP	PA
8910 - Aroclor-1260 (PCB-1260)	EPA 8082	10179007	NELAP	PA
8912 - Aroclor-1262 (PCB-1262)	EPA 8082	10179007	NELAP	PA
8913 - Aroclor-1268 (PCB-1268)	EPA 8082	10179007	NELAP	PA
7005 - Alachlor	EPA 8141	10181803	NELAP	PA
7065 - Atrazine	EPA 8141	10181803	NELAP	PA
7075 - Azinphos-methyl (Guthion)	EPA 8141	10181803	NELAP	PA
7125 - Bolstar (Sulprofos)	EPA 8141	10181803	NELAP	PA
7300 - Chlorpyrifos	EPA 8141	10181803	NELAP	PA
7315 - Coumaphos	EPA 8141	10181803	NELAP	PA
7395 - Demeton-o	EPA 8141	10181803	NELAP	PA
7385 - Demeton-s	EPA 8141	10181803	NELAP	PA
7410 - Diazinon	EPA 8141	10181803	NELAP	PA
8610 - Dichlorovos (DDVP, Dichlorvos)	EPA 8141	10181803	NELAP	PA
8625 - Disulfoton	EPA 8141	10181803	NELAP	PA
7550 - EPN	EPA 8141	10181803	NELAP	PA
7565 - Ethion	EPA 8141	10181803	NELAP	PA
7570 - Ethoprop	EPA 8141	10181803	NELAP	PA
7580 - Famphur	EPA 8141	10181803	NELAP	PA
7600 - Fensulfothion	EPA 8141	10181803	NELAP	PA
7770 - Malathion	EPA 8141	10181803	NELAP	PA
7785 - Merphos	EPA 8141	10181803	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8141	10181803	NELAP	PA
7835 - Metolachlor	EPA 8141	10181803	NELAP	PA
7850 - Mevinphos	EPA 8141	10181803	NELAP	PA
7905 - Naled	EPA 8141	10181803	NELAP	PA
7955 - Parathion, ethyl	EPA 8141	10181803	NELAP	PA
7985 - Phorate	EPA 8141	10181803	NELAP	PA
8110 - Ronnel	EPA 8141	10181803	NELAP	PA
8125 - Simazine	EPA 8141	10181803	NELAP	PA
8140 - Stirophos	EPA 8141	10181803	NELAP	PA
8245 - Tokuthion (Prothiophos)	EPA 8141	10181803	NELAP	PA
8275 - Trichloronate	EPA 8141	10181803	NELAP	PA
7005 - Alachlor	EPA 8141A	10182000	NELAP	PA
7065 - Atrazine	EPA 8141A	10182000	NELAP	PA
7075 - Azinphos-methyl (Guthion)	EPA 8141A	10182000	NELAP	PA
7125 - Bolstar (Sulprofos)	EPA 8141A	10182000	NELAP	PA
7300 - Chlorpyrifos	EPA 8141A	10182000	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
7315 - Coumaphos	EPA 8141A	10182000	NELAP	PA
7395 - Demeton-o	EPA 8141A	10182000	NELAP	PA
7385 - Demeton-s	EPA 8141A	10182000	NELAP	PA
7410 - Diazinon	EPA 8141A	10182000	NELAP	PA
8610 - Dichlorovos (DDVP, Dichlorvos)	EPA 8141A	10182000	NELAP	PA
8625 - Disulfoton	EPA 8141A	10182000	NELAP	PA
7550 - EPN	EPA 8141A	10182000	NELAP	PA
7565 - Ethion	EPA 8141A	10182000	NELAP	PA
7570 - Ethoprop	EPA 8141A	10182000	NELAP	PA
7580 - Famphur	EPA 8141A	10182000	NELAP	PA
7600 - Fensulfothion	EPA 8141A	10182000	NELAP	PA
7770 - Malathion	EPA 8141A	10182000	NELAP	PA
7785 - Merphos	EPA 8141A	10182000	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8141A	10182000	NELAP	PA
7835 - Metolachlor	EPA 8141A	10182000	NELAP	PA
7850 - Mevinphos	EPA 8141A	10182000	NELAP	PA
7905 - Naled	EPA 8141A	10182000	NELAP	PA
7955 - Parathion, ethyl	EPA 8141A	10182000	NELAP	PA
7985 - Phorate	EPA 8141A	10182000	NELAP	PA
8110 - Ronnel	EPA 8141A	10182000	NELAP	PA
8125 - Simazine	EPA 8141A	10182000	NELAP	PA
8140 - Stirophos	EPA 8141A	10182000	NELAP	PA
8245 - Tokuthion (Prothiophos)	EPA 8141A	10182000	NELAP	PA
8275 - Trichloronate	EPA 8141A	10182000	NELAP	PA
8655 - 2,4,5-T	EPA 8151	10183003	NELAP	PA
8545 - 2,4-D	EPA 8151	10183003	NELAP	PA
8560 - 2,4-DB	EPA 8151	10183003	NELAP	PA
8555 - Dalapon	EPA 8151	10183003	NELAP	PA
8595 - Dicamba	EPA 8151	10183003	NELAP	PA
8605 - Dichloroprop (Dichlorprop)	EPA 8151	10183003	NELAP	PA
7775 - MCPA	EPA 8151	10183003	NELAP	PA
7780 - MCPP	EPA 8151	10183003	NELAP	PA
6605 - Pentachlorophenol	EPA 8151	10183003	NELAP	PA
8645 - Picloram	EPA 8151	10183003	NELAP	PA
8650 - Silvex (2,4,5-TP)	EPA 8151	10183003	NELAP	PA
5105 - 1,1,1,2-Tetrachloroethane	EPA 8260B	10184802	NELAP	PA
5160 - 1,1,1-Trichloroethane	EPA 8260B	10184802	NELAP	PA
5110 - 1,1,2,2-Tetrachloroethane	EPA 8260B	10184802	NELAP	PA
5195 - 1,1,2-Trichloro-1,2,2-trifluoroethane	EPA 8260B	10184802	NELAP	PA
5185 - 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 8260B	10184802	NELAP	PA
5165 - 1,1,2-Trichloroethane	EPA 8260B	10184802	NELAP	PA
4630 - 1,1-Dichloroethane	EPA 8260B	10184802	NELAP	PA
4640 - 1,1-Dichloroethylene	EPA 8260B	10184802	NELAP	PA
4670 - 1,1-Dichloropropene	EPA 8260B	10184802	NELAP	PA
5150 - 1,2,3-Trichlorobenzene	EPA 8260B	10184802	NELAP	PA
5180 - 1,2,3-Trichloropropane	EPA 8260B	10184802	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8260B	10184802	NELAP	PA
5210 - 1,2,4-Trimethylbenzene	EPA 8260B	10184802	NELAP	PA
4570 - 1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B	10184802	NELAP	PA
4585 - 1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260B	10184802	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8260B	10184802	NELAP	PA
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA 8260B	10184802	NELAP	PA

Eurofins Lancaster Laboratories Inc
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Certificate Number: 02055

AI Number: 30729
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Non Potable Water

Analyte	Method Name	Method Code	Type	AB
4655 - 1,2-Dichloropropane	EPA 8260B	10184802	NELAP	PA
5215 - 1,3,5-Trimethylbenzene	EPA 8260B	10184802	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8260B	10184802	NELAP	PA
4660 - 1,3-Dichloropropane	EPA 8260B	10184802	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8260B	10184802	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260B	10184802	NELAP	PA
4665 - 2,2-Dichloropropane	EPA 8260B	10184802	NELAP	PA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260B	10184802	NELAP	PA
4500 - 2-Chloroethyl vinyl ether	EPA 8260B	10184802	NELAP	PA
4535 - 2-Chlorotoluene	EPA 8260B	10184802	NELAP	PA
4860 - 2-Hexanone	EPA 8260B	10184802	NELAP	PA
5020 - 2-Nitropropane	EPA 8260B	10184802	NELAP	PA
4540 - 4-Chlorotoluene	EPA 8260B	10184802	NELAP	PA
4910 - 4-Isopropyltoluene (p-Cymene)	EPA 8260B	10184802	NELAP	PA
4995 - 4-Methyl-2-pentanone (MIBK)	EPA 8260B	10184802	NELAP	PA
4315 - Acetone	EPA 8260B	10184802	NELAP	PA
4320 - Acetonitrile	EPA 8260B	10184802	NELAP	PA
4325 - Acrolein (Propenal)	EPA 8260B	10184802	NELAP	PA
4340 - Acrylonitrile	EPA 8260B	10184802	NELAP	PA
4350 - Allyl alcohol	EPA 8260B	10184802	NELAP	PA
4355 - Allyl chloride (3-Chloropropene)	EPA 8260B	10184802	NELAP	PA
4375 - Benzene	EPA 8260B	10184802	NELAP	PA
5635 - Benzyl chloride	EPA 8260B	10184802	NELAP	PA
4385 - Bromobenzene	EPA 8260B	10184802	NELAP	PA
4390 - Bromochloromethane	EPA 8260B	10184802	NELAP	PA
4395 - Bromodichloromethane	EPA 8260B	10184802	NELAP	PA
4400 - Bromoform	EPA 8260B	10184802	NELAP	PA
4450 - Carbon disulfide	EPA 8260B	10184802	NELAP	PA
4455 - Carbon tetrachloride	EPA 8260B	10184802	NELAP	PA
4475 - Chlorobenzene	EPA 8260B	10184802	NELAP	PA
4575 - Chlorodibromomethane	EPA 8260B	10184802	NELAP	PA
4485 - Chloroethane (Ethyl chloride)	EPA 8260B	10184802	NELAP	PA
4505 - Chloroform	EPA 8260B	10184802	NELAP	PA
4525 - Chloroprene (2-Chloro-1,3-butadiene)	EPA 8260B	10184802	NELAP	PA
4555 - Cyclohexane	EPA 8260B	10184802	NELAP	PA
9375 - Di-isopropylether (DIPE) (Isopropyl ether)	EPA 8260B	10184802	NELAP	PA
4580 - Dibromochloropropane	EPA 8260B	10184802	NELAP	PA
4590 - Dibromofluoromethane	EPA 8260B	10184802	NELAP	PA
4595 - Dibromomethane (Methylene bromide)	EPA 8260B	10184802	NELAP	PA
4625 - Dichlorodifluoromethane (Freon-12)	EPA 8260B	10184802	NELAP	PA
4745 - Epichlorohydrin (1-Chloro-2,3-epoxypropane)	EPA 8260B	10184802	NELAP	PA
4750 - Ethanol	EPA 8260B	10184802	NELAP	PA
4755 - Ethyl acetate	EPA 8260B	10184802	NELAP	PA
4810 - Ethyl methacrylate	EPA 8260B	10184802	NELAP	PA
4770 - Ethyl-t-butyl ether (ETBE) (2-Ethoxy-2-methylpropane)	EPA 8260B	10184802	NELAP	PA
4765 - Ethylbenzene	EPA 8260B	10184802	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8260B	10184802	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8260B	10184802	NELAP	PA
4870 - Iodomethane (Methyl iodide)	EPA 8260B	10184802	NELAP	PA
4875 - Isobutyl alcohol (2-Methyl-1-	EPA 8260B	10184802	NELAP	PA

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Non Potable Water

Analyte	Method Name	Method Code	Type	AB
propanol)				
4900 - Isopropylbenzene	EPA 8260B	10184802	NELAP	PA
4925 - Methacrylonitrile	EPA 8260B	10184802	NELAP	PA
4940 - Methyl acetate	EPA 8260B	10184802	NELAP	PA
4950 - Methyl bromide (Bromomethane)	EPA 8260B	10184802	NELAP	PA
4960 - Methyl chloride (Chloromethane)	EPA 8260B	10184802	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	EPA 8260B	10184802	NELAP	PA
4975 - Methylene chloride (Dichloromethane)	EPA 8260B	10184802	NELAP	PA
5005 - Naphthalene	EPA 8260B	10184802	NELAP	PA
5035 - Pentachloroethane	EPA 8260B	10184802	NELAP	PA
5080 - Propionitrile (Ethyl cyanide)	EPA 8260B	10184802	NELAP	PA
5100 - Styrene	EPA 8260B	10184802	NELAP	PA
4370 - T-amylmethylether (TAME)	EPA 8260B	10184802	NELAP	PA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA 8260B	10184802	NELAP	PA
5120 - Tetrahydrofuran (THF)	EPA 8260B	10184802	NELAP	PA
5140 - Toluene	EPA 8260B	10184802	NELAP	PA
5170 - Trichloroethene (Trichloroethylene)	EPA 8260B	10184802	NELAP	PA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA 8260B	10184802	NELAP	PA
5225 - Vinyl acetate	EPA 8260B	10184802	NELAP	PA
5235 - Vinyl chloride	EPA 8260B	10184802	NELAP	PA
5260 - Xylene (total)	EPA 8260B	10184802	NELAP	PA
4705 - cis & trans-1,2-Dichloroethene	EPA 8260B	10184802	NELAP	PA
4645 - cis-1,2-Dichloroethylene	EPA 8260B	10184802	NELAP	PA
4680 - cis-1,3-Dichloropropene	EPA 8260B	10184802	NELAP	PA
5240 - m+p-xylene	EPA 8260B	10184802	NELAP	PA
4425 - n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8260B	10184802	NELAP	PA
4435 - n-Butylbenzene	EPA 8260B	10184802	NELAP	PA
5085 - n-Propylamine	EPA 8260B	10184802	NELAP	PA
5090 - n-Propylbenzene	EPA 8260B	10184802	NELAP	PA
5250 - o-Xylene	EPA 8260B	10184802	NELAP	PA
4440 - sec-Butylbenzene	EPA 8260B	10184802	NELAP	PA
4420 - tert-Butyl alcohol	EPA 8260B	10184802	NELAP	PA
4445 - tert-Butylbenzene	EPA 8260B	10184802	NELAP	PA
4700 - trans-1,2-Dichloroethylene	EPA 8260B	10184802	NELAP	PA
4685 - trans-1,3-Dichloropropylene	EPA 8260B	10184802	NELAP	PA
4605 - trans-1,4-Dichloro-2-butene	EPA 8260B	10184802	NELAP	PA
6705 - 1,2,3,4-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	PA
6710 - 1,2,3,5-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	PA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8270C	10185805	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8270C	10185805	NELAP	PA
6220 - 1,2-Diphenylhydrazine	EPA 8270C	10185805	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270C	10185805	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8270C	10185805	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8270C	10185805	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8270C	10185805	NELAP	PA
6165 - 1,4-Dinitrobenzene	EPA 8270C	10185805	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8270C	10185805	NELAP	PA
6420 - 1,4-Naphthoquinone	EPA 8270C	10185805	NELAP	PA
6630 - 1,4-Phenylenediamine	EPA 8270C	10185805	NELAP	PA
5790 - 1-Chloronaphthalene	EPA 8270C	10185805	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270C	10185805	NELAP	PA

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Non Potable Water

Analyte	Method Name	Method Code	Type	AB
6425 - 1-Naphthylamine	EPA 8270C	10185805	NELAP	PA
6735 - 2,3,4,6-Tetrachlorophenol	EPA 8270C	10185805	NELAP	PA
6835 - 2,4,5-Trichlorophenol	EPA 8270C	10185805	NELAP	PA
6840 - 2,4,6-Trichlorophenol	EPA 8270C	10185805	NELAP	PA
6000 - 2,4-Dichlorophenol	EPA 8270C	10185805	NELAP	PA
6130 - 2,4-Dimethylphenol	EPA 8270C	10185805	NELAP	PA
6175 - 2,4-Dinitrophenol	EPA 8270C	10185805	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8270C	10185805	NELAP	PA
6005 - 2,6-Dichlorophenol	EPA 8270C	10185805	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8270C	10185805	NELAP	PA
5515 - 2-Acetylaminofluorene	EPA 8270C	10185805	NELAP	PA
9322 - 2-Butoxyethanol	EPA 8270C	10185805	NELAP	PA
5795 - 2-Chloronaphthalene	EPA 8270C	10185805	NELAP	PA
5800 - 2-Chlorophenol	EPA 8270C	10185805	NELAP	PA
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	EPA 8270C	10185805	NELAP	PA
5145 - 2-Methylaniline (o-Toluidine)	EPA 8270C	10185805	NELAP	PA
6385 - 2-Methylnaphthalene	EPA 8270C	10185805	NELAP	PA
6400 - 2-Methylphenol (o-Cresol)	EPA 8270C	10185805	NELAP	PA
6430 - 2-Naphthylamine	EPA 8270C	10185805	NELAP	PA
6460 - 2-Nitroaniline	EPA 8270C	10185805	NELAP	PA
6490 - 2-Nitrophenol	EPA 8270C	10185805	NELAP	PA
5050 - 2-Picoline (2-Methylpyridine)	EPA 8270C	10185805	NELAP	PA
5945 - 3,3'-Dichlorobenzidine	EPA 8270C	10185805	NELAP	PA
6120 - 3,3'-Dimethylbenzidine	EPA 8270C	10185805	NELAP	PA
6355 - 3-Methylcholanthrene	EPA 8270C	10185805	NELAP	PA
6405 - 3-Methylphenol (m-Cresol)	EPA 8270C	10185805	NELAP	PA
6465 - 3-Nitroaniline	EPA 8270C	10185805	NELAP	PA
5540 - 4-Aminobiphenyl	EPA 8270C	10185805	NELAP	PA
5660 - 4-Bromophenyl phenyl ether	EPA 8270C	10185805	NELAP	PA
5700 - 4-Chloro-3-methylphenol	EPA 8270C	10185805	NELAP	PA
5745 - 4-Chloroaniline	EPA 8270C	10185805	NELAP	PA
5825 - 4-Chlorophenyl phenylether	EPA 8270C	10185805	NELAP	PA
6105 - 4-Dimethyl aminoazobenzene	EPA 8270C	10185805	NELAP	PA
6410 - 4-Methylphenol (p-Cresol)	EPA 8270C	10185805	NELAP	PA
6470 - 4-Nitroaniline	EPA 8270C	10185805	NELAP	PA
6500 - 4-Nitrophenol	EPA 8270C	10185805	NELAP	PA
6510 - 4-Nitroquinoline 1-oxide	EPA 8270C	10185805	NELAP	PA
6570 - 5-Nitro-o-toluidine	EPA 8270C	10185805	NELAP	PA
6115 - 7,12-Dimethylbenz(a) anthracene	EPA 8270C	10185805	NELAP	PA
5500 - Acenaphthene	EPA 8270C	10185805	NELAP	PA
5505 - Acenaphthylene	EPA 8270C	10185805	NELAP	PA
5510 - Acetophenone	EPA 8270C	10185805	NELAP	PA
5545 - Aniline	EPA 8270C	10185805	NELAP	PA
5555 - Anthracene	EPA 8270C	10185805	NELAP	PA
5560 - Aramite	EPA 8270C	10185805	NELAP	PA
5567 - Benzenethiol	EPA 8270C	10185805	NELAP	PA
5595 - Benzidine	EPA 8270C	10185805	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270C	10185805	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270C	10185805	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270C	10185805	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270C	10185805	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270C	10185805	NELAP	PA
5610 - Benzoic acid	EPA 8270C	10185805	NELAP	PA
5630 - Benzyl alcohol	EPA 8270C	10185805	NELAP	PA
5640 - Biphenyl	EPA 8270C	10185805	NELAP	PA

Eurofins Lancaster Laboratories Inc
Issue Date: July 1, 2015 | **Certificate Number: 02055** | AI Number: 30729
Expiration Date: June 30, 2016

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
5670 - Butyl benzyl phthalate	EPA 8270C	10185805	NELAP	PA
7180 - Caprolactam	EPA 8270C	10185805	NELAP	PA
5680 - Carbazole	EPA 8270C	10185805	NELAP	PA
7260 - Chlorobenzilate	EPA 8270C	10185805	NELAP	PA
5855 - Chrysene	EPA 8270C	10185805	NELAP	PA
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	EPA 8270C	10185805	NELAP	PA
5925 - Di-n-butyl phthalate	EPA 8270C	10185805	NELAP	PA
6200 - Di-n-octyl phthalate	EPA 8270C	10185805	NELAP	PA
7405 - Diallate	EPA 8270C	10185805	NELAP	PA
9354 - Dibenz(a, h) acridine	EPA 8270C	10185805	NELAP	PA
5900 - Dibenz(a, j) acridine	EPA 8270C	10185805	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270C	10185805	NELAP	PA
5905 - Dibenzofuran	EPA 8270C	10185805	NELAP	PA
7475 - Dimethoate	EPA 8270C	10185805	NELAP	PA
6135 - Dimethyl phthalate	EPA 8270C	10185805	NELAP	PA
8620 - Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8270C	10185805	NELAP	PA
6205 - Diphenylamine	EPA 8270C	10185805	NELAP	PA
8625 - Disulfoton	EPA 8270C	10185805	NELAP	PA
6260 - Ethyl methanesulfonate	EPA 8270C	10185805	NELAP	PA
7580 - Famphur	EPA 8270C	10185805	NELAP	PA
6265 - Fluoranthene	EPA 8270C	10185805	NELAP	PA
6270 - Fluorene	EPA 8270C	10185805	NELAP	PA
6275 - Hexachlorobenzene	EPA 8270C	10185805	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8270C	10185805	NELAP	PA
6285 - Hexachlorocyclopentadiene	EPA 8270C	10185805	NELAP	PA
4840 - Hexachloroethane	EPA 8270C	10185805	NELAP	PA
6295 - Hexachloropropene	EPA 8270C	10185805	NELAP	PA
6312 - Indene	EPA 8270C	10185805	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270C	10185805	NELAP	PA
7725 - Isodrin	EPA 8270C	10185805	NELAP	PA
6320 - Isophorone	EPA 8270C	10185805	NELAP	PA
6325 - Isosafrole	EPA 8270C	10185805	NELAP	PA
7740 - Kepone	EPA 8270C	10185805	NELAP	PA
6345 - Methapyrilene	EPA 8270C	10185805	NELAP	PA
6375 - Methyl methanesulfonate	EPA 8270C	10185805	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8270C	10185805	NELAP	PA
5005 - Naphthalene	EPA 8270C	10185805	NELAP	PA
5015 - Nitrobenzene	EPA 8270C	10185805	NELAP	PA
7955 - Parathion, ethyl	EPA 8270C	10185805	NELAP	PA
6600 - Pentachloronitrobenzene	EPA 8270C	10185805	NELAP	PA
6605 - Pentachlorophenol	EPA 8270C	10185805	NELAP	PA
6610 - Phenacetin	EPA 8270C	10185805	NELAP	PA
6615 - Phenanthrene	EPA 8270C	10185805	NELAP	PA
6625 - Phenol	EPA 8270C	10185805	NELAP	PA
7985 - Phorate	EPA 8270C	10185805	NELAP	PA
6640 - Phthalic anhydride	EPA 8270C	10185805	NELAP	PA
6650 - Pronamide (Kerb)	EPA 8270C	10185805	NELAP	PA
6665 - Pyrene	EPA 8270C	10185805	NELAP	PA
5095 - Pyridine	EPA 8270C	10185805	NELAP	PA
6670 - Quinoline	EPA 8270C	10185805	NELAP	PA
6685 - Safrole	EPA 8270C	10185805	NELAP	PA
8155 - Sulfotepp	EPA 8270C	10185805	NELAP	PA
8210 - Tetraethyl pyrophosphate (TEPP)	EPA 8270C	10185805	NELAP	PA
8235 - Thionazin (Zinophos)	EPA 8270C	10185805	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
6750 - Thiophenol (Benzenethiol)	EPA 8270C	10185805	NELAP	PA
6755 - Tolualdehyde (1,2-Tolualdehyde)	EPA 8270C	10185805	NELAP	PA
6125 - a-a-Dimethylphenethylamine	EPA 8270C	10185805	NELAP	PA
5760 - bis(2-Chloroethoxy)methane	EPA 8270C	10185805	NELAP	PA
5765 - bis(2-Chloroethyl) ether	EPA 8270C	10185805	NELAP	PA
5780 - bis(2-Chloroisopropyl) ether	EPA 8270C	10185805	NELAP	PA
5025 - n-Nitroso-di-n-butylamine	EPA 8270C	10185805	NELAP	PA
6545 - n-Nitrosodi-n-propylamine	EPA 8270C	10185805	NELAP	PA
6525 - n-Nitrosodiethylamine	EPA 8270C	10185805	NELAP	PA
6530 - n-Nitrosodimethylamine	EPA 8270C	10185805	NELAP	PA
6535 - n-Nitrosodiphenylamine	EPA 8270C	10185805	NELAP	PA
6550 - n-Nitrosomethylethylamine	EPA 8270C	10185805	NELAP	PA
6555 - n-Nitrosomorpholine	EPA 8270C	10185805	NELAP	PA
6560 - n-Nitrosopiperidine	EPA 8270C	10185805	NELAP	PA
6565 - n-Nitrosopyrrolidine	EPA 8270C	10185805	NELAP	PA
8290 - o,o,o-Triethyl phosphorothioate	EPA 8270C	10185805	NELAP	PA
6105 - p-Dimethylaminoazobenzene	EPA 8270C	10185805	NELAP	PA
8310 - tris-(2,3-Dibromopropyl) phosphate (tris-BP)	EPA 8270C	10185805	NELAP	PA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 8270D	10186002	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8270D	10186002	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8270D	10186002	NELAP	PA
6220 - 1,2-Diphenylhydrazine	EPA 8270D	10186002	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270D	10186002	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8270D	10186002	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8270D	10186002	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8270D	10186002	NELAP	PA
6165 - 1,4-Dinitrobenzene	EPA 8270D	10186002	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8270D	10186002	NELAP	PA
6420 - 1,4-Naphthoquinone	EPA 8270D	10186002	NELAP	PA
6630 - 1,4-Phenylenediamine	EPA 8270D	10186002	NELAP	PA
5790 - 1-Chloronaphthalene	EPA 8270D	10186002	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270D	10186002	NELAP	PA
6425 - 1-Naphthylamine	EPA 8270D	10186002	NELAP	PA
6735 - 2,3,4,6-Tetrachlorophenol	EPA 8270D	10186002	NELAP	PA
6835 - 2,4,5-Trichlorophenol	EPA 8270D	10186002	NELAP	PA
6840 - 2,4,6-Trichlorophenol	EPA 8270D	10186002	NELAP	PA
6000 - 2,4-Dichlorophenol	EPA 8270D	10186002	NELAP	PA
6130 - 2,4-Dimethylphenol	EPA 8270D	10186002	NELAP	PA
6175 - 2,4-Dinitrophenol	EPA 8270D	10186002	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D	10186002	NELAP	PA
6005 - 2,6-Dichlorophenol	EPA 8270D	10186002	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D	10186002	NELAP	PA
5515 - 2-Acetylaminofluorene	EPA 8270D	10186002	NELAP	PA
5795 - 2-Chloronaphthalene	EPA 8270D	10186002	NELAP	PA
5800 - 2-Chlorophenol	EPA 8270D	10186002	NELAP	PA
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	EPA 8270D	10186002	NELAP	PA
5145 - 2-Methylaniline (o-Toluidine)	EPA 8270D	10186002	NELAP	PA
6385 - 2-Methylnaphthalene	EPA 8270D	10186002	NELAP	PA
6400 - 2-Methylphenol (o-Cresol)	EPA 8270D	10186002	NELAP	PA
6430 - 2-Naphthylamine	EPA 8270D	10186002	NELAP	PA
6460 - 2-Nitroaniline	EPA 8270D	10186002	NELAP	PA
6490 - 2-Nitrophenol	EPA 8270D	10186002	NELAP	PA
5050 - 2-Picoline (2-Methylpyridine)	EPA 8270D	10186002	NELAP	PA
5945 - 3,3'-Dichlorobenzidine	EPA 8270D	10186002	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
6120 - 3,3'-Dimethylbenzidine	EPA 8270D	10186002	NELAP	PA
6355 - 3-Methylcholanthrene	EPA 8270D	10186002	NELAP	PA
6405 - 3-Methylphenol (m-Cresol)	EPA 8270D	10186002	NELAP	PA
6465 - 3-Nitroaniline	EPA 8270D	10186002	NELAP	PA
5540 - 4-Aminobiphenyl	EPA 8270D	10186002	NELAP	PA
5660 - 4-Bromophenyl phenyl ether	EPA 8270D	10186002	NELAP	PA
5700 - 4-Chloro-3-methylphenol	EPA 8270D	10186002	NELAP	PA
5745 - 4-Chloroaniline	EPA 8270D	10186002	NELAP	PA
5825 - 4-Chlorophenyl phenylether	EPA 8270D	10186002	NELAP	PA
6410 - 4-Methylphenol (p-Cresol)	EPA 8270D	10186002	NELAP	PA
6470 - 4-Nitroaniline	EPA 8270D	10186002	NELAP	PA
6500 - 4-Nitrophenol	EPA 8270D	10186002	NELAP	PA
6510 - 4-Nitroquinoline 1-oxide	EPA 8270D	10186002	NELAP	PA
6570 - 5-Nitro-o-toluidine	EPA 8270D	10186002	NELAP	PA
6115 - 7,12-Dimethylbenz(a) anthracene	EPA 8270D	10186002	NELAP	PA
5500 - Acenaphthene	EPA 8270D	10186002	NELAP	PA
5505 - Acenaphthylene	EPA 8270D	10186002	NELAP	PA
5510 - Acetophenone	EPA 8270D	10186002	NELAP	PA
5545 - Aniline	EPA 8270D	10186002	NELAP	PA
5555 - Anthracene	EPA 8270D	10186002	NELAP	PA
5560 - Aramite	EPA 8270D	10186002	NELAP	PA
5567 - Benzenethiol	EPA 8270D	10186002	NELAP	PA
5595 - Benzidine	EPA 8270D	10186002	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270D	10186002	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270D	10186002	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270D	10186002	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270D	10186002	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270D	10186002	NELAP	PA
5610 - Benzoic acid	EPA 8270D	10186002	NELAP	PA
5630 - Benzyl alcohol	EPA 8270D	10186002	NELAP	PA
5635 - Benzyl chloride	EPA 8270D	10186002	NELAP	PA
5670 - Butyl benzyl phthalate	EPA 8270D	10186002	NELAP	PA
7180 - Caprolactam	EPA 8270D	10186002	NELAP	PA
5680 - Carbazole	EPA 8270D	10186002	NELAP	PA
5855 - Chrysene	EPA 8270D	10186002	NELAP	PA
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	EPA 8270D	10186002	NELAP	PA
5925 - Di-n-butyl phthalate	EPA 8270D	10186002	NELAP	PA
6200 - Di-n-octyl phthalate	EPA 8270D	10186002	NELAP	PA
7405 - Diallate	EPA 8270D	10186002	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270D	10186002	NELAP	PA
5905 - Dibenzofuran	EPA 8270D	10186002	NELAP	PA
6135 - Dimethyl phthalate	EPA 8270D	10186002	NELAP	PA
8620 - Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8270D	10186002	NELAP	PA
6205 - Diphenylamine	EPA 8270D	10186002	NELAP	PA
8625 - Disulfoton	EPA 8270D	10186002	NELAP	PA
6260 - Ethyl methanesulfonate	EPA 8270D	10186002	NELAP	PA
7580 - Famphur	EPA 8270D	10186002	NELAP	PA
6265 - Fluoranthene	EPA 8270D	10186002	NELAP	PA
6270 - Fluorene	EPA 8270D	10186002	NELAP	PA
6275 - Hexachlorobenzene	EPA 8270D	10186002	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8270D	10186002	NELAP	PA
6285 - Hexachlorocyclopentadiene	EPA 8270D	10186002	NELAP	PA
4840 - Hexachloroethane	EPA 8270D	10186002	NELAP	PA
6295 - Hexachloropropene	EPA 8270D	10186002	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270D	10186002	NELAP	PA
7725 - Isodrin	EPA 8270D	10186002	NELAP	PA
6320 - Isophorone	EPA 8270D	10186002	NELAP	PA
6325 - Isosafrole	EPA 8270D	10186002	NELAP	PA
7740 - Kepone	EPA 8270D	10186002	NELAP	PA
6345 - Methapyrilene	EPA 8270D	10186002	NELAP	PA
6375 - Methyl methanesulfonate	EPA 8270D	10186002	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8270D	10186002	NELAP	PA
5005 - Naphthalene	EPA 8270D	10186002	NELAP	PA
5015 - Nitrobenzene	EPA 8270D	10186002	NELAP	PA
7955 - Parathion, ethyl	EPA 8270D	10186002	NELAP	PA
6600 - Pentachloronitrobenzene	EPA 8270D	10186002	NELAP	PA
6605 - Pentachlorophenol	EPA 8270D	10186002	NELAP	PA
6610 - Phenacetin	EPA 8270D	10186002	NELAP	PA
6615 - Phenanthrene	EPA 8270D	10186002	NELAP	PA
6625 - Phenol	EPA 8270D	10186002	NELAP	PA
7985 - Phorate	EPA 8270D	10186002	NELAP	PA
6650 - Pronamide (Kerb)	EPA 8270D	10186002	NELAP	PA
5095 - Pyridine	EPA 8270D	10186002	NELAP	PA
6670 - Quinoline	EPA 8270D	10186002	NELAP	PA
6685 - Safrole	EPA 8270D	10186002	NELAP	PA
8155 - Sulfotepp	EPA 8270D	10186002	NELAP	PA
8235 - Thionazin (Zinophos)	EPA 8270D	10186002	NELAP	PA
6750 - Thiophenol (Benzenethiol)	EPA 8270D	10186002	NELAP	PA
6125 - a-a-Dimethylphenethylamine	EPA 8270D	10186002	NELAP	PA
5760 - bis(2-Chloroethoxy)methane	EPA 8270D	10186002	NELAP	PA
5765 - bis(2-Chloroethyl) ether	EPA 8270D	10186002	NELAP	PA
5780 - bis(2-Chloroisopropyl) ether	EPA 8270D	10186002	NELAP	PA
5025 - n-Nitroso-di-n-butylamine	EPA 8270D	10186002	NELAP	PA
6545 - n-Nitrosodi-n-propylamine	EPA 8270D	10186002	NELAP	PA
6525 - n-Nitrosodiethylamine	EPA 8270D	10186002	NELAP	PA
6530 - n-Nitrosodimethylamine	EPA 8270D	10186002	NELAP	PA
6535 - n-Nitrosodiphenylamine	EPA 8270D	10186002	NELAP	PA
6550 - n-Nitrosomethylethylamine	EPA 8270D	10186002	NELAP	PA
6555 - n-Nitrosomorpholine	EPA 8270D	10186002	NELAP	PA
6560 - n-Nitrosopiperidine	EPA 8270D	10186002	NELAP	PA
6565 - n-Nitrosopyrrolidine	EPA 8270D	10186002	NELAP	PA
8290 - o,o,o-Triethyl phosphorothioate	EPA 8270D	10186002	NELAP	PA
8310 - tris-(2,3-Dibromopropyl) phosphate (tris-BP)	EPA 8270D	10186002	NELAP	PA
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 8290A	10187403	NELAP	PA
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 8290A	10187403	NELAP	PA
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	EPA 8290A	10187403	NELAP	PA
9420 - 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	EPA 8290A	10187403	NELAP	PA
9423 - 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	EPA 8290A	10187403	NELAP	PA
9453 - 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	EPA 8290A	10187403	NELAP	PA
9471 - 1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	EPA 8290A	10187403	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
9456 - 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	EPA 8290A	10187403	NELAP	PA
9474 - 1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	EPA 8290A	10187403	NELAP	PA
9459 - 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	EPA 8290A	10187403	NELAP	PA
9477 - 1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	EPA 8290A	10187403	NELAP	PA
9540 - 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	EPA 8290A	10187403	NELAP	PA
9543 - 1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	EPA 8290A	10187403	NELAP	PA
9480 - 2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290A	10187403	NELAP	PA
9549 - 2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290A	10187403	NELAP	PA
9612 - 2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A	10187403	NELAP	PA
9438 - Total Hpcdd	EPA 8290A	10187403	NELAP	PA
9444 - Total Hpcdf	EPA 8290A	10187403	NELAP	PA
9468 - Total Hxcdd	EPA 8290A	10187403	NELAP	PA
9483 - Total Hxcdf	EPA 8290A	10187403	NELAP	PA
9555 - Total Pecdd	EPA 8290A	10187403	NELAP	PA
9552 - Total Pecdf	EPA 8290A	10187403	NELAP	PA
9609 - Total TCDD	EPA 8290A	10187403	NELAP	PA
9615 - Total TCDF	EPA 8290A	10187403	NELAP	PA
5500 - Acenaphthene	EPA 8310	10187607	NELAP	PA
5505 - Acenaphthylene	EPA 8310	10187607	NELAP	PA
5555 - Anthracene	EPA 8310	10187607	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8310	10187607	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8310	10187607	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8310	10187607	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8310	10187607	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8310	10187607	NELAP	PA
5855 - Chrysene	EPA 8310	10187607	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8310	10187607	NELAP	PA
6265 - Fluoranthene	EPA 8310	10187607	NELAP	PA
6270 - Fluorene	EPA 8310	10187607	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8310	10187607	NELAP	PA
5005 - Naphthalene	EPA 8310	10187607	NELAP	PA
6615 - Phenanthrene	EPA 8310	10187607	NELAP	PA
6665 - Pyrene	EPA 8310	10187607	NELAP	PA
6110 - 2,5-Dimethylbenzaldehyde	EPA 8315	10187801	NELAP	PA
4300 - Acetaldehyde	EPA 8315	10187801	NELAP	PA
4325 - Acrolein (Propenal)	EPA 8315	10187801	NELAP	PA
5570 - Benzaldehyde	EPA 8315	10187801	NELAP	PA
4430 - Butylaldehyde (Butanal)	EPA 8315	10187801	NELAP	PA
4545 - Crotonaldehyde	EPA 8315	10187801	NELAP	PA
4815 - Formaldehyde	EPA 8315	10187801	NELAP	PA
3825 - Hexanaldehyde (Hexanal)	EPA 8315	10187801	NELAP	PA
6330 - Isovaleraldehyde	EPA 8315	10187801	NELAP	PA
3965 - Propionaldehyde (Propanal)	EPA 8315	10187801	NELAP	PA
4040 - Valeraldehyde (Pentanal, Pentanaldehyde)	EPA 8315	10187801	NELAP	PA
4300 - Acetaldehyde	EPA 8315A	10188008	NELAP	PA
4815 - Formaldehyde	EPA 8315A	10188008	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330	10189807	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8330	10189807	NELAP	PA
9651 - 2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330	10189807	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8330	10189807	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8330	10189807	NELAP	PA
9303 - 2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330	10189807	NELAP	PA
9507 - 2-Nitrotoluene	EPA 8330	10189807	NELAP	PA
9510 - 3-Nitrotoluene	EPA 8330	10189807	NELAP	PA
9306 - 4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330	10189807	NELAP	PA
9513 - 4-Nitrotoluene	EPA 8330	10189807	NELAP	PA
6415 - Methyl-2,4,6-trinitrophenylnitramine (tetryl)	EPA 8330	10189807	NELAP	PA
5015 - Nitrobenzene	EPA 8330	10189807	NELAP	PA
6485 - Nitroglycerin	EPA 8330	10189807	NELAP	PA
9522 - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330	10189807	NELAP	PA
9558 - Pentaerythritoltetranitrate	EPA 8330	10189807	NELAP	PA
9432 - RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330	10189807	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330A	10190008	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8330A	10190008	NELAP	PA
9651 - 2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330A	10190008	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8330A	10190008	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8330A	10190008	NELAP	PA
9303 - 2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330A	10190008	NELAP	PA
9507 - 2-Nitrotoluene	EPA 8330A	10190008	NELAP	PA
9510 - 3-Nitrotoluene	EPA 8330A	10190008	NELAP	PA
9306 - 4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330A	10190008	NELAP	PA
9513 - 4-Nitrotoluene	EPA 8330A	10190008	NELAP	PA
6415 - Methyl-2,4,6-trinitrophenylnitramine (tetryl)	EPA 8330A	10190008	NELAP	PA
5015 - Nitrobenzene	EPA 8330A	10190008	NELAP	PA
6485 - Nitroglycerin	EPA 8330A	10190008	NELAP	PA
9522 - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330A	10190008	NELAP	PA
9558 - Pentaerythritoltetranitrate	EPA 8330A	10190008	NELAP	PA
9432 - RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330A	10190008	NELAP	PA
6485 - Nitroglycerin	EPA 8332	10190406	NELAP	PA
1645 - Total Cyanide	EPA 9012	10193201	NELAP	PA
1635 - Cyanide	EPA 9012A	10193405	NELAP	PA
1645 - Total Cyanide	EPA 9012A	10193405	NELAP	PA
1900 - pH	EPA 9040B	10197203	NELAP	PA
1625 - Corrosivity (pH)	EPA 9045	10197805	NELAP	PA
1900 - pH	EPA 9045	10197805	NELAP	PA
1610 - Conductivity	EPA 9050	10198604	NELAP	PA
1610 - Conductivity	EPA 9050A	10198808	NELAP	PA
1540 - Bromide	EPA 9056	10199005	NELAP	PA
1575 - Chloride	EPA 9056	10199005	NELAP	PA
1730 - Fluoride	EPA 9056	10199005	NELAP	PA
1805 - Nitrate	EPA 9056	10199005	NELAP	PA
1835 - Nitrite	EPA 9056	10199005	NELAP	PA
2000 - Sulfate	EPA 9056	10199005	NELAP	PA
1540 - Bromide	EPA 9056	10199209	NELAP	PA
1575 - Chloride	EPA 9056	10199209	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
1730 - Fluoride	EPA 9056	10199209	NELAP	PA
2000 - Sulfate	EPA 9056	10199209	NELAP	PA
1575 - Chloride	EPA 9056	10199403	NELAP	PA
1730 - Fluoride	EPA 9056	10199403	NELAP	PA
1805 - Nitrate	EPA 9056	10199403	NELAP	PA
1835 - Nitrite	EPA 9056	10199403	NELAP	PA
2000 - Sulfate	EPA 9056	10199403	NELAP	PA
1575 - Chloride	EPA 9056A	10199607	NELAP	PA
1730 - Fluoride	EPA 9056A	10199607	NELAP	PA
1805 - Nitrate	EPA 9056A	10199607	NELAP	PA
1835 - Nitrite	EPA 9056A	10199607	NELAP	PA
1840 - Nitrite as N	EPA 9056A	10199607	NELAP	PA
2000 - Sulfate	EPA 9056A	10199607	NELAP	PA
2040 - Total Organic Carbon	EPA 9060	10200201	NELAP	PA
1905 - Total Phenolics	EPA 9066	10200609	NELAP	PA
4747 - Ethane	EPA RSK-175 (GC/FID)	10212905	NELAP	PA
4752 - Ethene	EPA RSK-175 (GC/FID)	10212905	NELAP	PA
4926 - Methane	EPA RSK-175 (GC/FID)	10212905	NELAP	PA
100263 - Propane	EPA RSK-175 (GC/FID)	10212905	NELAP	PA
5007 - n-Butane	EPA RSK-175 (GC/FID)	10212905	NELAP	PA
5029 - n-Propane	EPA RSK-175 (GC/FID)	10212905	NELAP	PA
1095 - Mercury	EPA 1631E	10237204	NELAP	PA
1810 - Nitrate as N	EPA 353.2 (calc.)	10238809	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270C SIM	10242407	NELAP	PA
5500 - Acenaphthene	EPA 8270C SIM	10242407	NELAP	PA
5505 - Acenaphthylene	EPA 8270C SIM	10242407	NELAP	PA
5555 - Anthracene	EPA 8270C SIM	10242407	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270C SIM	10242407	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270C SIM	10242407	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270C SIM	10242407	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270C SIM	10242407	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270C SIM	10242407	NELAP	PA
5855 - Chrysene	EPA 8270C SIM	10242407	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270C SIM	10242407	NELAP	PA
6265 - Fluoranthene	EPA 8270C SIM	10242407	NELAP	PA
6270 - Fluorene	EPA 8270C SIM	10242407	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270C SIM	10242407	NELAP	PA
5005 - Naphthalene	EPA 8270C SIM	10242407	NELAP	PA
6615 - Phenanthrene	EPA 8270C SIM	10242407	NELAP	PA
6665 - Pyrene	EPA 8270C SIM	10242407	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270D SIM	10242509	NELAP	PA
9501 - 1-Methylphenanthrene	EPA 8270D SIM	10242509	NELAP	PA
5500 - Acenaphthene	EPA 8270D SIM	10242509	NELAP	PA
5505 - Acenaphthylene	EPA 8270D SIM	10242509	NELAP	PA
5555 - Anthracene	EPA 8270D SIM	10242509	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270D SIM	10242509	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270D SIM	10242509	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270D SIM	10242509	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270D SIM	10242509	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270D SIM	10242509	NELAP	PA
5855 - Chrysene	EPA 8270D SIM	10242509	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270D SIM	10242509	NELAP	PA
6265 - Fluoranthene	EPA 8270D SIM	10242509	NELAP	PA
6270 - Fluorene	EPA 8270D SIM	10242509	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270D SIM	10242509	NELAP	PA
5005 - Naphthalene	EPA 8270D SIM	10242509	NELAP	PA

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Analyte	Method Name	Method Code	Type	AB
6615 - Phenanthrene	EPA 8270D SIM	10242509	NELAP	PA
6665 - Pyrene	EPA 8270D SIM	10242509	NELAP	PA
1635 - Cyanide	EPA 9012B	10243206	NELAP	PA
1645 - Total Cyanide	EPA 9012B	10243206	NELAP	PA
1900 - pH	EPA 9040C	10244403	NELAP	PA
8946 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,3,3',4,5'+ 2,3',4,4'6+2,3',4',5'6-Pentachlorobiphenyl (BZ 86+87+97+108+119+125)	EPA 1668A	10262007	NELAP	PA
8958 - 2,2',3,6+2,2',4,6'-Tetrachlorobiphenyls (BZ 45 + 51)	EPA 1668A	10262007	NELAP	PA
8963 - 2,3,4,5+2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyls (BZ 61+70+74+76)	EPA 1668A	10262007	NELAP	PA
1575 - Chloride	EPA 300.0	10275408	NELAP	PA
1840 - Nitrite as N	EPA 300.0	10275408	NELAP	PA
2000 - Sulfate	EPA 300.0	10275408	NELAP	PA
1895 - Perchlorate	EPA 6850	10304606	NELAP	PA
1730 - Fluoride	SM 4500-F B	20012606	NELAP	PA
1605 - Color	SM 2120 B-1993, Online Edition	20039207	NELAP	PA
1500 - Acidity, as CaCO3	SM 2310 B, 20th ED	20044206	NELAP	PA
100410 - Alkalinity, bicarbonate	SM 2320 B, 18th ED	20044808	NELAP	LA
100411 - Alkalinity, carbonate	SM 2320 B, 18th ED	20044808	NELAP	LA
1505 - Alkalinity as CaCO3	SM 2320 B, 20th ED	20045209	NELAP	PA
1755 - Total hardness as CaCO3	SM 2340 B, 19th ED	20046008	NELAP	PA
1755 - Total hardness as CaCO3	SM 2340 B, 20th ED	20046202	NELAP	PA
1955 - Residue-filterable (TDS)	SM 2340 C, 20th ED	20047205	NELAP	PA
1610 - Conductivity	SM 2510 B, 20th ED	20048208	NELAP	PA
1610 - Conductivity	SM 2510 B, 21st ED	20048402	NELAP	PA
1950 - Residue-total	SM 2540 B, 20th ED	20049007	NELAP	PA
1950 - Residue-total	SM 2540 B-97, Online Edition	20049405	NELAP	PA
1955 - Residue-filterable (TDS)	SM 2540 C, 20th ED	20050004	NELAP	PA
1960 - Residue-nonfilterable (TSS)	SM 2540 D, 20th ED	20050800	NELAP	PA
1965 - Residue-settleable	SM 2540 F, 20th ED	20051803	NELAP	PA
2030 - Temperature, deg. C	SM 2550 B, 20th ED	20052806	NELAP	PA
1575 - Chloride	SM 4500-Cl¯ C, 20th ED	20084804	NELAP	PA
1940 - Total residual chlorine	SM 4500-Cl¯ F, 20th ED	20087201	NELAP	PA
1645 - Total Cyanide	SM 4500-CN¯ C, 20th ED	20091605	NELAP	PA
1635 - Cyanide	SM 4500-CN¯ E, 20th ED	20092404	NELAP	PA
1510 - Amenable cyanide	SM 4500-CN¯ G, 20th ED	20093203	NELAP	PA
1635 - Cyanide	SM 4500-CN¯ C, 21st ED	20095403	NELAP	PA
1730 - Fluoride	SM 4500-F¯ B, 20th ED	20101002	NELAP	PA
1730 - Fluoride	SM 4500-F¯ C, 20th ED	20102005	NELAP	OR
1730 - Fluoride	SM 4500-F C, 21st ED	20102209	NELAP	PA
1900 - pH	SM 4500-H+ B, 20th ED	20104807	NELAP	PA
1515 - Ammonia as N	SM 4500-NH3 B, 20th ED	20105606	NELAP	PA
1515 - Ammonia as N	SM 4500-NH3 C, 20th ED	20106405	NELAP	PA
1515 - Ammonia as N	SM 4500-NH3 D, 20th ED	20109006	NELAP	PA
1880 - Oxygen, dissolved	SM 4500-O G, 20th ED	20121204	NELAP	PA
1910 - Total Phosphorus	SM 4500-P B, 21st ED	20122809	NELAP	PA
1910 - Total Phosphorus	SM 4500-P B 5, 20th ED	20123200	NELAP	PA
1910 - Total Phosphorus	SM 4500-P E, 20th ED	20123802	NELAP	PA
1910 - Total Phosphorus	SM 4500-P F, 20th ED	20124601	NELAP	PA
2005 - Sulfide	SM 4500-S2¯ D, 20th ED	20125400	NELAP	PA
2005 - Sulfide	SM 4500-S2¯ F, 20th ED	20126209	NELAP	PA
1990 - Silica as SiO2	SM 4500-SiO2 C, 20th ED	20128205	NELAP	PA
2015 - Sulfite-SO3	SM 4500-SO3 B, 20th ED	20130205	NELAP	PA

Non Potable Water

Analyte	Method Name	Method Code	Type	AB
2015 - Sulfite-SO3	SM 4500-SO3 B, 21st ED	20130409	NELAP	PA
1530 - Biochemical oxygen demand	SM 5210 B, 20th ED	20134809	NELAP	PA
1555 - Carbonaceous BOD, CBOD	SM 5210 B, 20th ED	20134809	NELAP	PA
2040 - Total Organic Carbon	SM 5310 B, 20th ED	20137400	NELAP	PA
2040 - Total Organic Carbon	SM 5310 C, 20th ED	20138403	NELAP	PA
2025 - Surfactants - MBAS	SM 5540 C, 20th ED	20144609	NELAP	PA
1605 - Color	SM 2120 B, 20th ED	20224004	NELAP	PA
1645 - Total Cyanide	ASTM D7511-09	30032985	NELAP	PA
1523 - Available Cyanide	OIA 1677	60031405	NELAP	PA
1640 - Free cyanide	OIA 1677	60031405	NELAP	PA
6385 - 2-Methylnaphthalene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5500 - Acenaphthene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5505 - Acenaphthylene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5555 - Anthracene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5575 - Benzo(a)anthracene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5580 - Benzo(a)pyrene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5585 - Benzo(b)fluoranthene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5590 - Benzo(g,h,i)perylene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5600 - Benzo(k)fluoranthene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5855 - Chrysene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5895 - Dibenz(a,h) anthracene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6218 - EPH Aliphatic C19-C36	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6222 - EPH Aliphatic C9-C18	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6232 - EPH Aromatic C11-C22	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6234 - EPH Aromatic C11-C22 Unadjusted	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6265 - Fluoranthene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6270 - Fluorene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5005 - Naphthalene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6615 - Phenanthrene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6665 - Pyrene	MADEP EPH, Rev.1.1	90017202	NELAP	PA
4375 - Benzene	MADEP VPH, Rev.1.1	90017406	NELAP	PA
4765 - Ethylbenzene	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5005 - Naphthalene	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5140 - Toluene	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5304 - VPH Aliphatic C5-C8	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5305 - VPH Aliphatic C5-C8 Unadjusted	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5306 - VPH Aliphatic C9-C12	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5307 - VPH Aliphatic C9-C12 Unadjusted	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5311 - VPH Aromatic C9-C10	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5240 - m+p-xylene	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5250 - o-Xylene	MADEP VPH, Rev.1.1	90017406	NELAP	PA
2050 - Total Petroleum Hydrocarbons (TPH)	TNRCC 1005, Rev.3	90019208	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
2050 - Total Petroleum Hydrocarbons (TPH)	Texas 1006	867	NELAP	PA
1540 - Bromide	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1730 - Fluoride	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1810 - Nitrate as N	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1840 - Nitrite as N	EPA 300.0, Rev.2.1	10053200	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
2000 - Sulfate	EPA 300.0, Rev.2.1	10053200	NELAP	PA
1780 - Ignitability	EPA 1010	10116606	NELAP	PA
1466 - Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311	10118806	NELAP	PA
1460 - Synthetic Precipitation Leaching Procedure	EPA 1312	10119003	NELAP	PA
8954 - 2,2',3,3'+2,3',4',6-Tetrachlorobiphenyl (BZ-40+71)	EPA 1668	10129201	NELAP	PA
8919 - 2,2',3,3',4,4'+2,3,4,4',5,6-Hexachlorobiphenyl (BZ-128+166)	EPA 1668	10129201	NELAP	PA
9105 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl (BZ-209)	EPA 1668	10129201	NELAP	PA
9095 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	EPA 1668	10129201	NELAP	PA
9090 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	EPA 1668	10129201	NELAP	PA
9102 - 2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	EPA 1668	10129201	NELAP	PA
9101 - 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	EPA 1668	10129201	NELAP	PA
9103 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	EPA 1668	10129201	NELAP	PA
9065 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	EPA 1668	10129201	NELAP	PA
8916 - 2,2',3,3',4,4',6+2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-171+173)	EPA 1668	10129201	NELAP	PA
8933 - 2,2',3,3',4,4',6,6'+2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ 197+200)	EPA 1668	10129201	NELAP	PA
9104 - 2,2',3,3',4,4',6,6'-Octachlorobiphenyl (BZ-197)	EPA 1668	10129201	NELAP	PA
9106 - 2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ-171)	EPA 1668	10129201	NELAP	PA
9020 - 2,2',3,3',4,4'-Hexachlorobiphenyl (BZ-128)	EPA 1668	10129201	NELAP	PA
9114 - 2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ-177)	EPA 1668	10129201	NELAP	PA
9112 - 2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ-201)	EPA 1668	10129201	NELAP	PA
9115 - 2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	EPA 1668	10129201	NELAP	PA
9117 - 2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	EPA 1668	10129201	NELAP	PA
8922 - 2,2',3,3',4,5+2,2',3,4,4',5'+2,3,3',4',5,6-Hexachlorobiphenyl (BZ-129+138+163)	EPA 1668	10129201	NELAP	PA
9108 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-199)	EPA 1668	10129201	NELAP	PA
8934 - 2,2',3,3',4,5,5',6+2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-198+199)	EPA 1668	10129201	NELAP	PA
9107 - 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	EPA 1668	10129201	NELAP	PA
9109 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl (BZ-198)	EPA 1668	10129201	NELAP	PA
9110 - 2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	EPA 1668	10129201	NELAP	PA
9116 - 2,2',3,3',4,5,6'-Heptachlorobiphenyl	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
(BZ-174)				
9111 - 2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ-200)	EPA 1668	10129201	NELAP	PA
9113 - 2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-173)	EPA 1668	10129201	NELAP	PA
9118 - 2,2',3,3',4,5-Hexachlorobiphenyl (BZ-129)	EPA 1668	10129201	NELAP	PA
9120 - 2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	EPA 1668	10129201	NELAP	PA
9119 - 2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	EPA 1668	10129201	NELAP	PA
9121 - 2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	EPA 1668	10129201	NELAP	PA
9122 - 2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	EPA 1668	10129201	NELAP	PA
9123 - 2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	EPA 1668	10129201	NELAP	PA
9124 - 2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	EPA 1668	10129201	NELAP	PA
9125 - 2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	EPA 1668	10129201	NELAP	PA
8926 - 2,2',3,3',5,6'+2,2',3,5,5',6+2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-135+151+154)	EPA 1668	10129201	NELAP	PA
8927 - 2,2',3,3',5,6'+2,2',3,5,5',6-Hexachlorobiphenyls (BZ 135+151)	EPA 1668	10129201	NELAP	PA
9127 - 2,2',3,3',5,6'-Hexachlorobiphenyl (BZ-135)	EPA 1668	10129201	NELAP	PA
9126 - 2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	EPA 1668	10129201	NELAP	PA
9128 - 2,2',3,3',5,6-Hexachlorobiphenyl (BZ-134)	EPA 1668	10129201	NELAP	PA
9129 - 2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	EPA 1668	10129201	NELAP	PA
9130 - 2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	EPA 1668	10129201	NELAP	PA
9131 - 2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	EPA 1668	10129201	NELAP	PA
9132 - 2,2',3,3'-Tetrachlorobiphenyl (BZ-40)	EPA 1668	10129201	NELAP	PA
9151 - 2,2',3,4',5',6-Hexachlorobiphenyl (BZ-149)	EPA 1668	10129201	NELAP	PA
9154 - 2,2',3,4',5'-Pentachlorobiphenyl (BZ-97)	EPA 1668	10129201	NELAP	PA
8948 - 2,2',3,4',5+2,2',4,5,5'+2,3,3',5',6-Pentachlorobiphenyl (BZ-90+101+113)	EPA 1668	10129201	NELAP	PA
9080 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (BZ-187)	EPA 1668	10129201	NELAP	PA
9144 - 2,2',3,4',5,5'-Hexachlorobiphenyl (BZ-146)	EPA 1668	10129201	NELAP	PA
9147 - 2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	EPA 1668	10129201	NELAP	PA
8929 - 2,2',3,4',5,6+2,2',3,4',5',6-Hexachlorobiphenyl (BZ-147+149)	EPA 1668	10129201	NELAP	PA
9146 - 2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9149 - 2,2',3,4',5,6-Hexachlorobiphenyl (BZ-147)	EPA 1668	10129201	NELAP	PA
9155 - 2,2',3,4',5-Pentachlorobiphenyl (BZ-90)	EPA 1668	10129201	NELAP	PA
8951 - 2,2',3,4',6'+2,2',4,5,6'-Pentachlorobiphenyl (BZ-98+102)	EPA 1668	10129201	NELAP	PA
9159 - 2,2',3,4',6'-Pentachlorobiphenyl (BZ-98)	EPA 1668	10129201	NELAP	PA
9157 - 2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	EPA 1668	10129201	NELAP	PA
9160 - 2,2',3,4',6-Pentachlorobiphenyl (BZ-91)	EPA 1668	10129201	NELAP	PA
9162 - 2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	EPA 1668	10129201	NELAP	PA
8941 - 2,2',3,4,4'+2,3,4,5,6+2,3,4',5,6-Pentachlorobiphenyl (BZ-85+116+117)	EPA 1668	10129201	NELAP	PA
8942 - 2,2',3,4,4'+2,3,4,5,6-Pentachlorobiphenyl (BZ-85+116)	EPA 1668	10129201	NELAP	PA
8918 - 2,2',3,4,4',5',6+2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-183+185)	EPA 1668	10129201	NELAP	PA
9075 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (BZ-183)	EPA 1668	10129201	NELAP	PA
9025 - 2,2',3,4,4',5'-Hexachlorobiphenyl (BZ-138)	EPA 1668	10129201	NELAP	PA
8917 - 2,2',3,4,4',5,5'+2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-180+193)	EPA 1668	10129201	NELAP	PA
9133 - 2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	EPA 1668	10129201	NELAP	PA
9134 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ-180)	EPA 1668	10129201	NELAP	PA
9136 - 2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	EPA 1668	10129201	NELAP	PA
9135 - 2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	EPA 1668	10129201	NELAP	PA
9137 - 2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	EPA 1668	10129201	NELAP	PA
9138 - 2,2',3,4,4',5-Hexachlorobiphenyl (BZ-137)	EPA 1668	10129201	NELAP	PA
9140 - 2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-140)	EPA 1668	10129201	NELAP	PA
8928 - 2,2',3,4,4',6+2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-139+140)	EPA 1668	10129201	NELAP	PA
9139 - 2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	EPA 1668	10129201	NELAP	PA
9141 - 2,2',3,4,4',6-Hexachlorobiphenyl (BZ-139)	EPA 1668	10129201	NELAP	PA
9142 - 2,2',3,4,4'-Pentachlorobiphenyl (BZ-85)	EPA 1668	10129201	NELAP	PA
9150 - 2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	EPA 1668	10129201	NELAP	PA
8975 - 2,2',3,4,5'-Pentachlorobiphenyl (BZ-87)	EPA 1668	10129201	NELAP	PA
8944 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,2',4,4',6-Pentachlorobiphenyl (BZ-86+87+97+100)	EPA 1668	10129201	NELAP	PA
8946 -	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,3,3',4,5'+ 2,3',4,4'6+2,3',4',5'6-Pentachlorobiphenyl (BZ 86+87+97+108+119+125)				
9143 - 2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-185)	EPA 1668	10129201	NELAP	PA
9030 - 2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	EPA 1668	10129201	NELAP	PA
9152 - 2,2',3,4,5,6'-Hexachlorobiphenyl (BZ-143)	EPA 1668	10129201	NELAP	PA
9145 - 2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	EPA 1668	10129201	NELAP	PA
9148 - 2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	EPA 1668	10129201	NELAP	PA
9153 - 2,2',3,4,5-Pentachlorobiphenyl (BZ-86)	EPA 1668	10129201	NELAP	PA
9161 - 2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	EPA 1668	10129201	NELAP	PA
8947 - 2,2',3,4,6+2,2',3,4',6-Pentachlorobiphenyl (BZ-88+91)	EPA 1668	10129201	NELAP	PA
9156 - 2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	EPA 1668	10129201	NELAP	PA
9158 - 2,2',3,4,6-Pentachlorobiphenyl (BZ-88)	EPA 1668	10129201	NELAP	PA
9163 - 2,2',3,4-Tetrachlorobiphenyl (BZ-41)	EPA 1668	10129201	NELAP	PA
8957 - 2,2',3,5'+2,2',4,4'+2,3,5,6-Tetrachlorobiphenyl (BZ-44+47+65)	EPA 1668	10129201	NELAP	PA
9166 - 2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	EPA 1668	10129201	NELAP	PA
8945 - 2,2',3,5'-Tetrachlorobiphenyl (BZ-44)	EPA 1668	10129201	NELAP	PA
8956 - 2,2',3,5+2,3',5',6-Tetrachlorobiphenyl (BZ-43+73)	EPA 1668	10129201	NELAP	PA
9035 - 2,2',3,5,5',6-Hexachlorobiphenyl (BZ-151)	EPA 1668	10129201	NELAP	PA
9164 - 2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	EPA 1668	10129201	NELAP	PA
9167 - 2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	EPA 1668	10129201	NELAP	PA
8949 - 2,2',3,5,6+2,2',4,4',6-Pentachlorobiphenyl (BZ-93+100)	EPA 1668	10129201	NELAP	PA
9165 - 2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	EPA 1668	10129201	NELAP	PA
9168 - 2,2',3,5,6-Pentachlorobiphenyl (BZ-93)	EPA 1668	10129201	NELAP	PA
9169 - 2,2',3,5-Tetrachlorobiphenyl (BZ-43)	EPA 1668	10129201	NELAP	PA
9171 - 2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	EPA 1668	10129201	NELAP	PA
9170 - 2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	EPA 1668	10129201	NELAP	PA
9172 - 2,2',3,6-Tetrachlorobiphenyl (BZ-45)	EPA 1668	10129201	NELAP	PA
9173 - 2,2',3-Trichlorobiphenyl (BZ-16)	EPA 1668	10129201	NELAP	PA
8931 - 2,2',4,4',5,5'+2,3',4,4',5',6-Hexachlorobiphenyl (BZ-153+168)	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9040 - 2,2',4,4',5,5'-Hexachlorobiphenyl (BZ-153)	EPA 1668	10129201	NELAP	PA
9174 - 2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	EPA 1668	10129201	NELAP	PA
9175 - 2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	EPA 1668	10129201	NELAP	PA
9176 - 2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	EPA 1668	10129201	NELAP	PA
9177 - 2,2',4,4',6-Pentachlorobiphenyl (BZ-100)	EPA 1668	10129201	NELAP	PA
9178 - 2,2',4,4'-Tetrachlorobiphenyl (BZ-47)	EPA 1668	10129201	NELAP	PA
8959 - 2,2',4,5'+2,3',4,6-Tetrachlorobiphenyl (BZ-49+69)	EPA 1668	10129201	NELAP	PA
9179 - 2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	EPA 1668	10129201	NELAP	PA
8950 - 2,2',4,5'-Tetrachlorobiphenyl (BZ-49)	EPA 1668	10129201	NELAP	PA
8980 - 2,2',4,5,5'-Pentachlorobiphenyl (BZ-101)	EPA 1668	10129201	NELAP	PA
9180 - 2,2',4,5,6'-Pentachlorobiphenyl (BZ-102)	EPA 1668	10129201	NELAP	PA
9181 - 2,2',4,5-Tetrachlorobiphenyl (BZ-48)	EPA 1668	10129201	NELAP	PA
9183 - 2,2',4,6'-Tetrachlorobiphenyl (BZ-51)	EPA 1668	10129201	NELAP	PA
8961 - 2,2',4,6+2,2',5,6'-Tetrachlorobiphenyl (BZ-50+53)	EPA 1668	10129201	NELAP	PA
9182 - 2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	EPA 1668	10129201	NELAP	PA
9184 - 2,2',4,6-Tetrachlorobiphenyl (BZ-50)	EPA 1668	10129201	NELAP	PA
9185 - 2,2',4-Trichlorobiphenyl (BZ-17)	EPA 1668	10129201	NELAP	PA
8966 - 2,2',5+2,4,6-Trichlorobiphenyl (BZ-18+30)	EPA 1668	10129201	NELAP	PA
8955 - 2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	EPA 1668	10129201	NELAP	PA
9186 - 2,2',5,6'-Tetrachlorobiphenyl (BZ-53)	EPA 1668	10129201	NELAP	PA
8930 - 2,2',5-Trichlorobiphenyl (BZ-18)	EPA 1668	10129201	NELAP	PA
9187 - 2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	EPA 1668	10129201	NELAP	PA
9188 - 2,2',6-Trichlorobiphenyl (BZ-19)	EPA 1668	10129201	NELAP	PA
9189 - 2,2'-Dichlorobiphenyl (BZ-4)	EPA 1668	10129201	NELAP	PA
9224 - 2,3',4',5',6-Pentachlorobiphenyl (BZ-125)	EPA 1668	10129201	NELAP	PA
9229 - 2,3',4',5'-Tetrachlorobiphenyl (BZ-76)	EPA 1668	10129201	NELAP	PA
8964 - 2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyl (BZ-70+74+76)	EPA 1668	10129201	NELAP	PA
9222 - 2,3',4',5,5'-Pentachlorobiphenyl (BZ-124)	EPA 1668	10129201	NELAP	PA
9230 - 2,3',4',5-Tetrachlorobiphenyl (BZ-70)	EPA 1668	10129201	NELAP	PA
9237 - 2,3',4',6-Tetrachlorobiphenyl (BZ-71)	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9239 - 2,3',4'-Trichlorobiphenyl (BZ-33)	EPA 1668	10129201	NELAP	PA
9218 - 2,3',4,4',5',6-Hexachlorobiphenyl (BZ-168)	EPA 1668	10129201	NELAP	PA
9000 - 2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	EPA 1668	10129201	NELAP	PA
9055 - 2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	EPA 1668	10129201	NELAP	PA
8995 - 2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	EPA 1668	10129201	NELAP	PA
9220 - 2,3',4,4',6-Pentachlorobiphenyl (BZ-119)	EPA 1668	10129201	NELAP	PA
8960 - 2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	EPA 1668	10129201	NELAP	PA
9226 - 2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	EPA 1668	10129201	NELAP	PA
9231 - 2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	EPA 1668	10129201	NELAP	PA
9223 - 2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	EPA 1668	10129201	NELAP	PA
9232 - 2,3',4,5-Tetrachlorobiphenyl (BZ-67)	EPA 1668	10129201	NELAP	PA
9235 - 2,3',4,6-Tetrachlorobiphenyl (BZ-69)	EPA 1668	10129201	NELAP	PA
9240 - 2,3',4-Trichlorobiphenyl (BZ-25)	EPA 1668	10129201	NELAP	PA
9244 - 2,3',5',6-Tetrachlorobiphenyl (BZ-73)	EPA 1668	10129201	NELAP	PA
9246 - 2,3',5'-Trichlorobiphenyl (BZ-34)	EPA 1668	10129201	NELAP	PA
8969 - 2,3',5+2,4,5-Trichlorobiphenyl (BZ-26+29)	EPA 1668	10129201	NELAP	PA
9242 - 2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	EPA 1668	10129201	NELAP	PA
8935 - 2,3',5-Trichlorobiphenyl (BZ-26)	EPA 1668	10129201	NELAP	PA
9248 - 2,3',6-Trichlorobiphenyl (BZ-27)	EPA 1668	10129201	NELAP	PA
9249 - 2,3'-Dichlorobiphenyl (BZ-6)	EPA 1668	10129201	NELAP	PA
8967 - 2,3,3'+2,4,4'-Trichlorobiphenyl (BZ-20+28)	EPA 1668	10129201	NELAP	PA
9201 - 2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	EPA 1668	10129201	NELAP	PA
9202 - 2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	EPA 1668	10129201	NELAP	PA
8936 - 2,3,3',4',5+2,3',4',5,5'-Pentachlorobiphenyl (BZ-107+124)	EPA 1668	10129201	NELAP	PA
9195 - 2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-193)	EPA 1668	10129201	NELAP	PA
9197 - 2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	EPA 1668	10129201	NELAP	PA
9199 - 2,3,3',4',5,6-Hexachlorobiphenyl (BZ-163)	EPA 1668	10129201	NELAP	PA
9205 - 2,3,3',4',5-Pentachlorobiphenyl (BZ-107)	EPA 1668	10129201	NELAP	PA
8938 - 2,3,3',4',6+2,3,4,4',6-Pentachlorobiphenyl (BZ-110+115)	EPA 1668	10129201	NELAP	PA
8990 - 2,3,3',4',6-Pentachlorobiphenyl (BZ-110)	EPA 1668	10129201	NELAP	PA
9207 - 2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9192 - 2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	EPA 1668	10129201	NELAP	PA
9045 - 2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	EPA 1668	10129201	NELAP	PA
8932 - 2,3,3',4,4',5+2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-156+157)	EPA 1668	10129201	NELAP	PA
9190 - 2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	EPA 1668	10129201	NELAP	PA
9085 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	EPA 1668	10129201	NELAP	PA
9191 - 2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	EPA 1668	10129201	NELAP	PA
9050 - 2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	EPA 1668	10129201	NELAP	PA
9193 - 2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	EPA 1668	10129201	NELAP	PA
8985 - 2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	EPA 1668	10129201	NELAP	PA
9200 - 2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	EPA 1668	10129201	NELAP	PA
9203 - 2,3,3',4,5'-Pentachlorobiphenyl (BZ-108)	EPA 1668	10129201	NELAP	PA
9196 - 2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	EPA 1668	10129201	NELAP	PA
9198 - 2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	EPA 1668	10129201	NELAP	PA
9204 - 2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	EPA 1668	10129201	NELAP	PA
9206 - 2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	EPA 1668	10129201	NELAP	PA
9208 - 2,3,3',4-Tetrachlorobiphenyl (BZ-55)	EPA 1668	10129201	NELAP	PA
9212 - 2,3,3',5',6-Pentachlorobiphenyl (BZ-113)	EPA 1668	10129201	NELAP	PA
9213 - 2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	EPA 1668	10129201	NELAP	PA
9209 - 2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	EPA 1668	10129201	NELAP	PA
9210 - 2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	EPA 1668	10129201	NELAP	PA
9211 - 2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	EPA 1668	10129201	NELAP	PA
9214 - 2,3,3',5-Tetrachlorobiphenyl (BZ-57)	EPA 1668	10129201	NELAP	PA
8962 - 2,3,3',6+2,3,4,6+2,4,4',6-Tetrachlorobiphenyl (BZ-59+62+75)	EPA 1668	10129201	NELAP	PA
9215 - 2,3,3',6-Tetrachlorobiphenyl (BZ-59)	EPA 1668	10129201	NELAP	PA
9216 - 2,3,3'-Trichlorobiphenyl (BZ-20)	EPA 1668	10129201	NELAP	PA
9227 - 2,3,4',5,6-Pentachlorobiphenyl (BZ-117)	EPA 1668	10129201	NELAP	PA
9233 - 2,3,4',5-Tetrachlorobiphenyl (BZ-63)	EPA 1668	10129201	NELAP	PA
9236 - 2,3,4',6-Tetrachlorobiphenyl (BZ-64)	EPA 1668	10129201	NELAP	PA
9241 - 2,3,4'-Trichlorobiphenyl (BZ-22)	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
8968 - 2,3,4+2,3',4'-Trichlorobiphenyl (BZ-21+33)	EPA 1668	10129201	NELAP	PA
9217 - 2,3,4,4',5,6-Hexachlorobiphenyl (BZ-166)	EPA 1668	10129201	NELAP	PA
9005 - 2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	EPA 1668	10129201	NELAP	PA
9219 - 2,3,4,4',6-Pentachlorobiphenyl (BZ-115)	EPA 1668	10129201	NELAP	PA
9221 - 2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	EPA 1668	10129201	NELAP	PA
8963 - 2,3,4,5+2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyls (BZ 61+70+74+76)	EPA 1668	10129201	NELAP	PA
9225 - 2,3,4,5,6-Pentachlorobiphenyl (BZ-116)	EPA 1668	10129201	NELAP	PA
9228 - 2,3,4,5-Tetrachlorobiphenyl (BZ-61)	EPA 1668	10129201	NELAP	PA
9234 - 2,3,4,6-Tetrachlorobiphenyl (BZ-62)	EPA 1668	10129201	NELAP	PA
9238 - 2,3,4-Trichlorobiphenyl (BZ-21)	EPA 1668	10129201	NELAP	PA
9243 - 2,3,5,6-Tetrachlorobiphenyl (BZ-65)	EPA 1668	10129201	NELAP	PA
9245 - 2,3,5-Trichlorobiphenyl (BZ-23)	EPA 1668	10129201	NELAP	PA
9247 - 2,3,6-Trichlorobiphenyl (BZ-24)	EPA 1668	10129201	NELAP	PA
8920 - 2,3-Dichlorobiphenyl (BZ-5)	EPA 1668	10129201	NELAP	PA
8940 - 2,4',5-Trichlorobiphenyl (BZ-31)	EPA 1668	10129201	NELAP	PA
9255 - 2,4',6-Trichlorobiphenyl (BZ-32)	EPA 1668	10129201	NELAP	PA
9256 - 2,4'-Dichlorobiphenyl (BZ-8)	EPA 1668	10129201	NELAP	PA
9250 - 2,4,4',5-Tetrachlorobiphenyl (BZ-74)	EPA 1668	10129201	NELAP	PA
9251 - 2,4,4',6-Tetrachlorobiphenyl (BZ-75)	EPA 1668	10129201	NELAP	PA
9252 - 2,4,4'-Trichlorobiphenyl (BZ-28)	EPA 1668	10129201	NELAP	PA
9253 - 2,4,5-Trichlorobiphenyl (BZ-29)	EPA 1668	10129201	NELAP	PA
9254 - 2,4,6-Trichlorobiphenyl (BZ-30)	EPA 1668	10129201	NELAP	PA
9257 - 2,4-Dichlorobiphenyl (BZ-7)	EPA 1668	10129201	NELAP	PA
9258 - 2,5-Dichlorobiphenyl (BZ-9)	EPA 1668	10129201	NELAP	PA
9259 - 2,6-Dichlorobiphenyl (BZ-10)	EPA 1668	10129201	NELAP	PA
8915 - 2-Chlorobiphenyl (BZ-1)	EPA 1668	10129201	NELAP	PA
9060 - 3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	EPA 1668	10129201	NELAP	PA
9015 - 3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	EPA 1668	10129201	NELAP	PA
8965 - 3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	EPA 1668	10129201	NELAP	PA
9261 - 3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	EPA 1668	10129201	NELAP	PA
9260 - 3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	EPA 1668	10129201	NELAP	PA
9262 - 3,3',4,5-Tetrachlorobiphenyl (BZ-78)	EPA 1668	10129201	NELAP	PA
9263 - 3,3',4-Trichlorobiphenyl (BZ-35)	EPA 1668	10129201	NELAP	PA
9264 - 3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	EPA 1668	10129201	NELAP	PA
9265 - 3,3',5-Trichlorobiphenyl (BZ-36)	EPA 1668	10129201	NELAP	PA
8925 - 3,3'-Dichlorobiphenyl (BZ-11)	EPA 1668	10129201	NELAP	PA
9268 - 3,4',5-Trichlorobiphenyl (BZ-39)	EPA 1668	10129201	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9269 - 3,4'-Dichlorobiphenyl (BZ-13)	EPA 1668	10129201	NELAP	PA
100098 - 3,4+3,4'-Dichlorobiphenyl (BZ-12+13)	EPA 1668	10129201	NELAP	PA
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	EPA 1668	10129201	NELAP	PA
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	EPA 1668	10129201	NELAP	PA
9267 - 3,4,5-Trichlorobiphenyl (BZ-38)	EPA 1668	10129201	NELAP	PA
9270 - 3,4-Dichlorobiphenyl (BZ-12)	EPA 1668	10129201	NELAP	PA
9271 - 3,5-Dichlorobiphenyl (BZ-14)	EPA 1668	10129201	NELAP	PA
9272 - 3-Chlorobiphenyl (BZ-2)	EPA 1668	10129201	NELAP	PA
100368 - 3-Monochlorobiphenyl (BZ 2)	EPA 1668	10129201	NELAP	PA
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	EPA 1668	10129201	NELAP	PA
9274 - 4-Chlorobiphenyl (BZ-3)	EPA 1668	10129201	NELAP	PA
8954 - 2,2',3,3'+2,3',4',6-Tetrachlorobiphenyl (BZ-40+71)	EPA 1668A	10129405	NELAP	PA
8919 - 2,2',3,3',4,4'+2,3,4,4',5,6-Hexachlorobiphenyl (BZ-128+166)	EPA 1668A	10129405	NELAP	PA
9105 - 2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl (BZ-209)	EPA 1668A	10129405	NELAP	PA
9095 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	EPA 1668A	10129405	NELAP	PA
9090 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	EPA 1668A	10129405	NELAP	PA
9102 - 2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	EPA 1668A	10129405	NELAP	PA
9101 - 2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	EPA 1668A	10129405	NELAP	PA
9103 - 2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	EPA 1668A	10129405	NELAP	PA
9065 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	EPA 1668A	10129405	NELAP	PA
8916 - 2,2',3,3',4,4',6+2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-171+173)	EPA 1668A	10129405	NELAP	PA
8933 - 2,2',3,3',4,4',6,6'+2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ 197+200)	EPA 1668A	10129405	NELAP	PA
9104 - 2,2',3,3',4,4',6,6'-Octachlorobiphenyl (BZ-197)	EPA 1668A	10129405	NELAP	PA
9106 - 2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ-171)	EPA 1668A	10129405	NELAP	PA
9020 - 2,2',3,3',4,4'-Hexachlorobiphenyl (BZ-128)	EPA 1668A	10129405	NELAP	PA
9114 - 2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ-177)	EPA 1668A	10129405	NELAP	PA
9112 - 2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ-201)	EPA 1668A	10129405	NELAP	PA
9115 - 2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	EPA 1668A	10129405	NELAP	PA
9117 - 2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	EPA 1668A	10129405	NELAP	PA
8922 - 2,2',3,3',4,5+2,2',3,4,4',5'+2,3,3',4',5,6-Hexachlorobiphenyl (BZ-129+138+163)	EPA 1668A	10129405	NELAP	PA
9108 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-199)	EPA 1668A	10129405	NELAP	PA
8934 - 2,2',3,3',4,5,5',6+2,2',3,3',4,5,5',6'-Octachlorobiphenyl (BZ-198+199)	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9107 - 2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	EPA 1668A	10129405	NELAP	PA
9109 - 2,2',3,3',4,5,5',6-Octachlorobiphenyl (BZ-198)	EPA 1668A	10129405	NELAP	PA
9110 - 2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	EPA 1668A	10129405	NELAP	PA
9116 - 2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-174)	EPA 1668A	10129405	NELAP	PA
9111 - 2,2',3,3',4,5,6,6'-Octachlorobiphenyl (BZ-200)	EPA 1668A	10129405	NELAP	PA
9113 - 2,2',3,3',4,5,6-Heptachlorobiphenyl (BZ-173)	EPA 1668A	10129405	NELAP	PA
9118 - 2,2',3,3',4,5-Hexachlorobiphenyl (BZ-129)	EPA 1668A	10129405	NELAP	PA
9120 - 2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	EPA 1668A	10129405	NELAP	PA
9119 - 2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	EPA 1668A	10129405	NELAP	PA
9121 - 2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	EPA 1668A	10129405	NELAP	PA
9122 - 2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	EPA 1668A	10129405	NELAP	PA
9123 - 2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	EPA 1668A	10129405	NELAP	PA
9124 - 2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	EPA 1668A	10129405	NELAP	PA
9125 - 2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	EPA 1668A	10129405	NELAP	PA
8926 - 2,2',3,3',5,6'+2,2',3,5,5',6+2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-135+151+154)	EPA 1668A	10129405	NELAP	PA
8927 - 2,2',3,3',5,6'+2,2',3,5,5',6-Hexachlorobiphenyls (BZ 135+151)	EPA 1668A	10129405	NELAP	PA
9127 - 2,2',3,3',5,6'-Hexachlorobiphenyl (BZ-135)	EPA 1668A	10129405	NELAP	PA
9126 - 2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	EPA 1668A	10129405	NELAP	PA
9128 - 2,2',3,3',5,6-Hexachlorobiphenyl (BZ-134)	EPA 1668A	10129405	NELAP	PA
9129 - 2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	EPA 1668A	10129405	NELAP	PA
9130 - 2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	EPA 1668A	10129405	NELAP	PA
9131 - 2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	EPA 1668A	10129405	NELAP	PA
9132 - 2,2',3,3'-Tetrachlorobiphenyl (BZ-40)	EPA 1668A	10129405	NELAP	PA
9151 - 2,2',3,4',5',6-Hexachlorobiphenyl (BZ-149)	EPA 1668A	10129405	NELAP	PA
9154 - 2,2',3,4',5'-Pentachlorobiphenyl (BZ-97)	EPA 1668A	10129405	NELAP	PA
8948 - 2,2',3,4',5+2,2',4,5,5'+2,3,3',5',6-Pentachlorobiphenyl (BZ-90+101+113)	EPA 1668A	10129405	NELAP	PA
9080 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (BZ-187)	EPA 1668A	10129405	NELAP	PA
9144 - 2,2',3,4',5,5'-Hexachlorobiphenyl	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
(BZ-146)				
9147 - 2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	EPA 1668A	10129405	NELAP	PA
8929 - 2,2',3,4',5,6+2,2',3,4',5',6-Hexachlorobiphenyl (BZ-147+149)	EPA 1668A	10129405	NELAP	PA
9146 - 2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	EPA 1668A	10129405	NELAP	PA
9149 - 2,2',3,4',5,6-Hexachlorobiphenyl (BZ-147)	EPA 1668A	10129405	NELAP	PA
9155 - 2,2',3,4',5-Pentachlorobiphenyl (BZ-90)	EPA 1668A	10129405	NELAP	PA
8951 - 2,2',3,4',6'+2,2',4,5,6'-Pentachlorobiphenyl (BZ-98+102)	EPA 1668A	10129405	NELAP	PA
9159 - 2,2',3,4',6'-Pentachlorobiphenyl (BZ-98)	EPA 1668A	10129405	NELAP	PA
9157 - 2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	EPA 1668A	10129405	NELAP	PA
9160 - 2,2',3,4',6-Pentachlorobiphenyl (BZ-91)	EPA 1668A	10129405	NELAP	PA
9162 - 2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	EPA 1668A	10129405	NELAP	PA
8941 - 2,2',3,4,4'+2,3,4,5,6+2,3,4',5,6-Pentachlorobiphenyl (BZ-85+116+117)	EPA 1668A	10129405	NELAP	PA
8918 - 2,2',3,4,4',5',6+2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-183+185)	EPA 1668A	10129405	NELAP	PA
9075 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (BZ-183)	EPA 1668A	10129405	NELAP	PA
9025 - 2,2',3,4,4',5'-Hexachlorobiphenyl (BZ-138)	EPA 1668A	10129405	NELAP	PA
8917 - 2,2',3,4,4',5,5'+2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-180+193)	EPA 1668A	10129405	NELAP	PA
9133 - 2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	EPA 1668A	10129405	NELAP	PA
9134 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (BZ-180)	EPA 1668A	10129405	NELAP	PA
9136 - 2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	EPA 1668A	10129405	NELAP	PA
9135 - 2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	EPA 1668A	10129405	NELAP	PA
9137 - 2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	EPA 1668A	10129405	NELAP	PA
9138 - 2,2',3,4,4',5-Hexachlorobiphenyl (BZ-137)	EPA 1668A	10129405	NELAP	PA
9140 - 2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-140)	EPA 1668A	10129405	NELAP	PA
8928 - 2,2',3,4,4',6+2,2',3,4,4',6'-Hexachlorobiphenyl (BZ-139+140)	EPA 1668A	10129405	NELAP	PA
9139 - 2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	EPA 1668A	10129405	NELAP	PA
9141 - 2,2',3,4,4',6-Hexachlorobiphenyl (BZ-139)	EPA 1668A	10129405	NELAP	PA
9142 - 2,2',3,4,4'-Pentachlorobiphenyl (BZ-85)	EPA 1668A	10129405	NELAP	PA
9150 - 2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	EPA 1668A	10129405	NELAP	PA
8975 - 2,2',3,4,5'-Pentachlorobiphenyl	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
(BZ-87)				
8944 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,2',4,4',6-Pentachlorobiphenyl (BZ-86+87+97+100)	EPA 1668A	10129405	NELAP	PA
8946 - 2,2',3,4,5+2,2',3,4,5'+2,2',3,4',5'+2,3,3',4,5'+2,3',4,4'6+2,3',4',5'6-Pentachlorobiphenyl (BZ 86+87+97+108+119+125)	EPA 1668A	10129405	NELAP	PA
9143 - 2,2',3,4,5,5',6-Heptachlorobiphenyl (BZ-185)	EPA 1668A	10129405	NELAP	PA
9030 - 2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	EPA 1668A	10129405	NELAP	PA
9152 - 2,2',3,4,5,6'-Hexachlorobiphenyl (BZ-143)	EPA 1668A	10129405	NELAP	PA
9145 - 2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	EPA 1668A	10129405	NELAP	PA
9148 - 2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	EPA 1668A	10129405	NELAP	PA
9153 - 2,2',3,4,5-Pentachlorobiphenyl (BZ-86)	EPA 1668A	10129405	NELAP	PA
9161 - 2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	EPA 1668A	10129405	NELAP	PA
8947 - 2,2',3,4,6+2,2',3,4',6-Pentachlorobiphenyl (BZ-88+91)	EPA 1668A	10129405	NELAP	PA
9156 - 2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	EPA 1668A	10129405	NELAP	PA
9158 - 2,2',3,4,6-Pentachlorobiphenyl (BZ-88)	EPA 1668A	10129405	NELAP	PA
9163 - 2,2',3,4-Tetrachlorobiphenyl (BZ-41)	EPA 1668A	10129405	NELAP	PA
8957 - 2,2',3,5'+2,2',4,4'+2,3,5,6-Tetrachlorobiphenyl (BZ-44+47+65)	EPA 1668A	10129405	NELAP	PA
9166 - 2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	EPA 1668A	10129405	NELAP	PA
8945 - 2,2',3,5'-Tetrachlorobiphenyl (BZ-44)	EPA 1668A	10129405	NELAP	PA
8956 - 2,2',3,5+2,3',5',6-Tetrachlorobiphenyl (BZ-43+73)	EPA 1668A	10129405	NELAP	PA
9035 - 2,2',3,5,5',6-Hexachlorobiphenyl (BZ-151)	EPA 1668A	10129405	NELAP	PA
9164 - 2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	EPA 1668A	10129405	NELAP	PA
9167 - 2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	EPA 1668A	10129405	NELAP	PA
8949 - 2,2',3,5,6+2,2',4,4',6-Pentachlorobiphenyl (BZ-93+100)	EPA 1668A	10129405	NELAP	PA
9165 - 2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	EPA 1668A	10129405	NELAP	PA
9168 - 2,2',3,5,6-Pentachlorobiphenyl (BZ-93)	EPA 1668A	10129405	NELAP	PA
9169 - 2,2',3,5-Tetrachlorobiphenyl (BZ-43)	EPA 1668A	10129405	NELAP	PA
9171 - 2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	EPA 1668A	10129405	NELAP	PA
8958 - 2,2',3,6+2,2',4,6'-Tetrachlorobiphenyls (BZ 45 + 51)	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9170 - 2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	EPA 1668A	10129405	NELAP	PA
9172 - 2,2',3,6-Tetrachlorobiphenyl (BZ-45)	EPA 1668A	10129405	NELAP	PA
9173 - 2,2',3-Trichlorobiphenyl (BZ-16)	EPA 1668A	10129405	NELAP	PA
8931 - 2,2',4,4',5,5'+2,3',4,4',5',6-Hexachlorobiphenyl (BZ-153+168)	EPA 1668A	10129405	NELAP	PA
9040 - 2,2',4,4',5,5'-Hexachlorobiphenyl (BZ-153)	EPA 1668A	10129405	NELAP	PA
9174 - 2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	EPA 1668A	10129405	NELAP	PA
9175 - 2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	EPA 1668A	10129405	NELAP	PA
9176 - 2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	EPA 1668A	10129405	NELAP	PA
9177 - 2,2',4,4',6-Pentachlorobiphenyl (BZ-100)	EPA 1668A	10129405	NELAP	PA
9178 - 2,2',4,4'-Tetrachlorobiphenyl (BZ-47)	EPA 1668A	10129405	NELAP	PA
8959 - 2,2',4,5'+2,3',4,6-Tetrachlorobiphenyl (BZ-49+69)	EPA 1668A	10129405	NELAP	PA
9179 - 2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	EPA 1668A	10129405	NELAP	PA
8950 - 2,2',4,5'-Tetrachlorobiphenyl (BZ-49)	EPA 1668A	10129405	NELAP	PA
8980 - 2,2',4,5,5'-Pentachlorobiphenyl (BZ-101)	EPA 1668A	10129405	NELAP	PA
9180 - 2,2',4,5,6'-Pentachlorobiphenyl (BZ-102)	EPA 1668A	10129405	NELAP	PA
9181 - 2,2',4,5-Tetrachlorobiphenyl (BZ-48)	EPA 1668A	10129405	NELAP	PA
9183 - 2,2',4,6'-Tetrachlorobiphenyl (BZ-51)	EPA 1668A	10129405	NELAP	PA
8961 - 2,2',4,6+2,2',5,6'-Tetrachlorobiphenyl (BZ-50+53)	EPA 1668A	10129405	NELAP	PA
9182 - 2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	EPA 1668A	10129405	NELAP	PA
9184 - 2,2',4,6-Tetrachlorobiphenyl (BZ-50)	EPA 1668A	10129405	NELAP	PA
9185 - 2,2',4-Trichlorobiphenyl (BZ-17)	EPA 1668A	10129405	NELAP	PA
8966 - 2,2',5+2,4,6-Trichlorobiphenyl (BZ-18+30)	EPA 1668A	10129405	NELAP	PA
8955 - 2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	EPA 1668A	10129405	NELAP	PA
9186 - 2,2',5,6'-Tetrachlorobiphenyl (BZ-53)	EPA 1668A	10129405	NELAP	PA
8930 - 2,2',5-Trichlorobiphenyl (BZ-18)	EPA 1668A	10129405	NELAP	PA
9187 - 2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	EPA 1668A	10129405	NELAP	PA
9188 - 2,2',6-Trichlorobiphenyl (BZ-19)	EPA 1668A	10129405	NELAP	PA
9189 - 2,2'-Dichlorobiphenyl (BZ-4)	EPA 1668A	10129405	NELAP	PA
9224 - 2,3',4',5',6-Pentachlorobiphenyl (BZ-125)	EPA 1668A	10129405	NELAP	PA
9229 - 2,3',4',5'-Tetrachlorobiphenyl (BZ-76)	EPA 1668A	10129405	NELAP	PA
8964 - 2,3',4',5+2,4,4',5+2,3',4',5'-	EPA 1668A	10129405	NELAP	PA

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
Tetrachlorobiphenyl (BZ-70+74+76)				
9222 - 2,3',4',5,5'-Pentachlorobiphenyl (BZ-124)	EPA 1668A	10129405	NELAP	PA
9230 - 2,3',4',5-Tetrachlorobiphenyl (BZ-70)	EPA 1668A	10129405	NELAP	PA
9237 - 2,3',4',6-Tetrachlorobiphenyl (BZ-71)	EPA 1668A	10129405	NELAP	PA
9239 - 2,3',4'-Trichlorobiphenyl (BZ-33)	EPA 1668A	10129405	NELAP	PA
9218 - 2,3',4,4',5',6-Hexachlorobiphenyl (BZ-168)	EPA 1668A	10129405	NELAP	PA
9000 - 2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	EPA 1668A	10129405	NELAP	PA
9055 - 2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	EPA 1668A	10129405	NELAP	PA
8995 - 2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	EPA 1668A	10129405	NELAP	PA
9220 - 2,3',4,4',6-Pentachlorobiphenyl (BZ-119)	EPA 1668A	10129405	NELAP	PA
8960 - 2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	EPA 1668A	10129405	NELAP	PA
9226 - 2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	EPA 1668A	10129405	NELAP	PA
9231 - 2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	EPA 1668A	10129405	NELAP	PA
9223 - 2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	EPA 1668A	10129405	NELAP	PA
9232 - 2,3',4,5-Tetrachlorobiphenyl (BZ-67)	EPA 1668A	10129405	NELAP	PA
9235 - 2,3',4,6-Tetrachlorobiphenyl (BZ-69)	EPA 1668A	10129405	NELAP	PA
9240 - 2,3',4-Trichlorobiphenyl (BZ-25)	EPA 1668A	10129405	NELAP	PA
9244 - 2,3',5',6-Tetrachlorobiphenyl (BZ-73)	EPA 1668A	10129405	NELAP	PA
9246 - 2,3',5'-Trichlorobiphenyl (BZ-34)	EPA 1668A	10129405	NELAP	PA
8969 - 2,3',5+2,4,5-Trichlorobiphenyl (BZ-26+29)	EPA 1668A	10129405	NELAP	PA
9242 - 2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	EPA 1668A	10129405	NELAP	PA
8935 - 2,3',5-Trichlorobiphenyl (BZ-26)	EPA 1668A	10129405	NELAP	PA
9248 - 2,3',6-Trichlorobiphenyl (BZ-27)	EPA 1668A	10129405	NELAP	PA
9249 - 2,3'-Dichlorobiphenyl (BZ-6)	EPA 1668A	10129405	NELAP	PA
8967 - 2,3,3'+2,4,4'-Trichlorobiphenyl (BZ-20+28)	EPA 1668A	10129405	NELAP	PA
9201 - 2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	EPA 1668A	10129405	NELAP	PA
9202 - 2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	EPA 1668A	10129405	NELAP	PA
8936 - 2,3,3',4',5+2,3',4',5,5'-Pentachlorobiphenyl (BZ-107+124)	EPA 1668A	10129405	NELAP	PA
9195 - 2,3,3',4',5,5',6-Heptachlorobiphenyl (BZ-193)	EPA 1668A	10129405	NELAP	PA
9197 - 2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	EPA 1668A	10129405	NELAP	PA
9199 - 2,3,3',4',5,6-Hexachlorobiphenyl (BZ-163)	EPA 1668A	10129405	NELAP	PA
9205 - 2,3,3',4',5-Pentachlorobiphenyl	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
(BZ-107)				
8938 - 2,3,3',4',6+2,3,4,4',6-Pentachlorobiphenyl (BZ-110+115)	EPA 1668A	10129405	NELAP	PA
8990 - 2,3,3',4',6-Pentachlorobiphenyl (BZ-110)	EPA 1668A	10129405	NELAP	PA
9207 - 2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	EPA 1668A	10129405	NELAP	PA
9192 - 2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	EPA 1668A	10129405	NELAP	PA
9045 - 2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	EPA 1668A	10129405	NELAP	PA
8932 - 2,3,3',4,4',5+2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-156+157)	EPA 1668A	10129405	NELAP	PA
9190 - 2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	EPA 1668A	10129405	NELAP	PA
9085 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	EPA 1668A	10129405	NELAP	PA
9191 - 2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	EPA 1668A	10129405	NELAP	PA
9050 - 2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	EPA 1668A	10129405	NELAP	PA
9193 - 2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	EPA 1668A	10129405	NELAP	PA
8985 - 2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	EPA 1668A	10129405	NELAP	PA
9200 - 2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	EPA 1668A	10129405	NELAP	PA
9203 - 2,3,3',4,5'-Pentachlorobiphenyl (BZ-108)	EPA 1668A	10129405	NELAP	PA
9194 - 2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ-192)	EPA 1668A	10129405	NELAP	PA
9196 - 2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	EPA 1668A	10129405	NELAP	PA
9198 - 2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	EPA 1668A	10129405	NELAP	PA
9204 - 2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	EPA 1668A	10129405	NELAP	PA
9206 - 2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	EPA 1668A	10129405	NELAP	PA
9208 - 2,3,3',4-Tetrachlorobiphenyl (BZ-55)	EPA 1668A	10129405	NELAP	PA
9212 - 2,3,3',5',6-Pentachlorobiphenyl (BZ-113)	EPA 1668A	10129405	NELAP	PA
9213 - 2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	EPA 1668A	10129405	NELAP	PA
9209 - 2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	EPA 1668A	10129405	NELAP	PA
9210 - 2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	EPA 1668A	10129405	NELAP	PA
9211 - 2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	EPA 1668A	10129405	NELAP	PA
9214 - 2,3,3',5-Tetrachlorobiphenyl (BZ-57)	EPA 1668A	10129405	NELAP	PA
8962 - 2,3,3',6+2,3,4,6+2,4,4',6-Tetrachlorobiphenyl (BZ-59+62+75)	EPA 1668A	10129405	NELAP	PA
9215 - 2,3,3',6-Tetrachlorobiphenyl (BZ-	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
59)				
9216 - 2,3,3'-Trichlorobiphenyl (BZ-20)	EPA 1668A	10129405	NELAP	PA
9227 - 2,3,4',5,6-Pentachlorobiphenyl (BZ-117)	EPA 1668A	10129405	NELAP	PA
9233 - 2,3,4',5-Tetrachlorobiphenyl (BZ-63)	EPA 1668A	10129405	NELAP	PA
9236 - 2,3,4',6-Tetrachlorobiphenyl (BZ-64)	EPA 1668A	10129405	NELAP	PA
9241 - 2,3,4'-Trichlorobiphenyl (BZ-22)	EPA 1668A	10129405	NELAP	PA
8968 - 2,3,4+2,3',4'-Trichlorobiphenyl (BZ-21+33)	EPA 1668A	10129405	NELAP	PA
9217 - 2,3,4,4',5,6-Hexachlorobiphenyl (BZ-166)	EPA 1668A	10129405	NELAP	PA
9005 - 2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	EPA 1668A	10129405	NELAP	PA
9219 - 2,3,4,4',6-Pentachlorobiphenyl (BZ-115)	EPA 1668A	10129405	NELAP	PA
9221 - 2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	EPA 1668A	10129405	NELAP	PA
8963 - 2,3,4,5+2,3',4',5+2,4,4',5+2,3',4',5'-Tetrachlorobiphenyls (BZ 61+70+74+76)	EPA 1668A	10129405	NELAP	PA
9225 - 2,3,4,5,6-Pentachlorobiphenyl (BZ-116)	EPA 1668A	10129405	NELAP	PA
9228 - 2,3,4,5-Tetrachlorobiphenyl (BZ-61)	EPA 1668A	10129405	NELAP	PA
9234 - 2,3,4,6-Tetrachlorobiphenyl (BZ-62)	EPA 1668A	10129405	NELAP	PA
9238 - 2,3,4-Trichlorobiphenyl (BZ-21)	EPA 1668A	10129405	NELAP	PA
9243 - 2,3,5,6-Tetrachlorobiphenyl (BZ-65)	EPA 1668A	10129405	NELAP	PA
9245 - 2,3,5-Trichlorobiphenyl (BZ-23)	EPA 1668A	10129405	NELAP	PA
9247 - 2,3,6-Trichlorobiphenyl (BZ-24)	EPA 1668A	10129405	NELAP	PA
8920 - 2,3-Dichlorobiphenyl (BZ-5)	EPA 1668A	10129405	NELAP	PA
8940 - 2,4',5-Trichlorobiphenyl (BZ-31)	EPA 1668A	10129405	NELAP	PA
9255 - 2,4',6-Trichlorobiphenyl (BZ-32)	EPA 1668A	10129405	NELAP	PA
9256 - 2,4'-Dichlorobiphenyl (BZ-8)	EPA 1668A	10129405	NELAP	PA
9250 - 2,4,4',5-Tetrachlorobiphenyl (BZ-74)	EPA 1668A	10129405	NELAP	PA
9251 - 2,4,4',6-Tetrachlorobiphenyl (BZ-75)	EPA 1668A	10129405	NELAP	PA
9252 - 2,4,4'-Trichlorobiphenyl (BZ-28)	EPA 1668A	10129405	NELAP	PA
9253 - 2,4,5-Trichlorobiphenyl (BZ-29)	EPA 1668A	10129405	NELAP	PA
9254 - 2,4,6-Trichlorobiphenyl (BZ-30)	EPA 1668A	10129405	NELAP	PA
9257 - 2,4-Dichlorobiphenyl (BZ-7)	EPA 1668A	10129405	NELAP	PA
9258 - 2,5-Dichlorobiphenyl (BZ-9)	EPA 1668A	10129405	NELAP	PA
9259 - 2,6-Dichlorobiphenyl (BZ-10)	EPA 1668A	10129405	NELAP	PA
8915 - 2-Chlorobiphenyl (BZ-1)	EPA 1668A	10129405	NELAP	PA
9060 - 3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	EPA 1668A	10129405	NELAP	PA
9015 - 3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	EPA 1668A	10129405	NELAP	PA
8965 - 3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	EPA 1668A	10129405	NELAP	PA
9261 - 3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	EPA 1668A	10129405	NELAP	PA
9260 - 3,3',4,5,5'-Pentachlorobiphenyl	EPA 1668A	10129405	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
(BZ-127)				
9262 - 3,3',4,5-Tetrachlorobiphenyl (BZ-78)	EPA 1668A	10129405	NELAP	PA
9263 - 3,3',4-Trichlorobiphenyl (BZ-35)	EPA 1668A	10129405	NELAP	PA
9264 - 3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	EPA 1668A	10129405	NELAP	PA
9265 - 3,3',5-Trichlorobiphenyl (BZ-36)	EPA 1668A	10129405	NELAP	PA
8925 - 3,3'-Dichlorobiphenyl (BZ-11)	EPA 1668A	10129405	NELAP	PA
9268 - 3,4',5-Trichlorobiphenyl (BZ-39)	EPA 1668A	10129405	NELAP	PA
9269 - 3,4'-Dichlorobiphenyl (BZ-13)	EPA 1668A	10129405	NELAP	PA
100098 - 3,4+3,4'-Dichlorobiphenyl (BZ-12+13)	EPA 1668A	10129405	NELAP	PA
8970 - 3,4,4',5-Tetrachlorobiphenyl (BZ-81)	EPA 1668A	10129405	NELAP	PA
9266 - 3,4,4'-Trichlorobiphenyl (BZ-37)	EPA 1668A	10129405	NELAP	PA
9267 - 3,4,5-Trichlorobiphenyl (BZ-38)	EPA 1668A	10129405	NELAP	PA
9270 - 3,4-Dichlorobiphenyl (BZ-12)	EPA 1668A	10129405	NELAP	PA
9271 - 3,5-Dichlorobiphenyl (BZ-14)	EPA 1668A	10129405	NELAP	PA
9272 - 3-Chlorobiphenyl (BZ-2)	EPA 1668A	10129405	NELAP	PA
9273 - 4,4'-Dichlorobiphenyl (BZ-15)	EPA 1668A	10129405	NELAP	PA
9274 - 4-Chlorobiphenyl (BZ-3)	EPA 1668A	10129405	NELAP	PA
8872 - PCB Aroclor Identification	EPA 1668A	10129405	NELAP	PA
8870 - PCBs	EPA 1668A	10129405	NELAP	PA
8875 - PCBs, as congeners	EPA 1668A	10129405	NELAP	PA
8876 - Total Dichlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8877 - Total Heptachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8888 - Total Hexachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8889 - Total Monochlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8891 - Total Nonachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8892 - Total Octachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8896 - Total Pentachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8893 - Total Tetrachlorobiphenyls	EPA 1668A	10129405	NELAP	PA
8894 - Total Trichlorobiphenyls	EPA 1668A	10129405	NELAP	PA
100007 - Acid Digestion of Sediments, Sludges, and soils	EPA 3050B	10135601	NELAP	PA
1402 - Alkaline Digestion for Hexavalent Chromium	EPA 3060A	10136604	NELAP	PA
1444 - Separatory Funnel Liquid-liquid extraction	EPA 3510C	10138202	NELAP	PA
1452 - Soxhlet Extraction	EPA 3540C	10140202	NELAP	PA
1428 - Microwave Extraction	EPA 3546	10141205	NELAP	PA
1468 - Ultrasonic Extraction	EPA 3550C	10142004	NELAP	PA
1456 - Sulfur Clean-Up	EPA 3660B	10148400	NELAP	PA
2020 - Sulfuric acid/permanganate clean-up	EPA 3665	10148604	NELAP	PA
2020 - Sulfuric acid/permanganate clean-up	EPA 3665A	10148808	NELAP	PA
100017 - Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples	EPA 5030	10153001	NELAP	PA
1406 - Purge and trap for aqueous phase samples	EPA 5030	10153001	NELAP	PA
100017 - Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples	EPA 5035	10154004	NELAP	PA
1145 - Silicon	EPA 6010	10155201	NELAP	PA
1000 - Aluminum	EPA 6010B	10155609	NELAP	PA
1005 - Antimony	EPA 6010B	10155609	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
1010 - Arsenic	EPA 6010B	10155609	NELAP	PA
1015 - Barium	EPA 6010B	10155609	NELAP	PA
1020 - Beryllium	EPA 6010B	10155609	NELAP	PA
1025 - Boron	EPA 6010B	10155609	NELAP	PA
1030 - Cadmium	EPA 6010B	10155609	NELAP	PA
1035 - Calcium	EPA 6010B	10155609	NELAP	PA
1040 - Chromium	EPA 6010B	10155609	NELAP	PA
1050 - Cobalt	EPA 6010B	10155609	NELAP	PA
1055 - Copper	EPA 6010B	10155609	NELAP	PA
1070 - Iron	EPA 6010B	10155609	NELAP	PA
1075 - Lead	EPA 6010B	10155609	NELAP	PA
1080 - Lithium	EPA 6010B	10155609	NELAP	PA
1085 - Magnesium	EPA 6010B	10155609	NELAP	PA
1090 - Manganese	EPA 6010B	10155609	NELAP	PA
1100 - Molybdenum	EPA 6010B	10155609	NELAP	PA
1105 - Nickel	EPA 6010B	10155609	NELAP	PA
1125 - Potassium	EPA 6010B	10155609	NELAP	PA
1140 - Selenium	EPA 6010B	10155609	NELAP	PA
1150 - Silver	EPA 6010B	10155609	NELAP	PA
1155 - Sodium	EPA 6010B	10155609	NELAP	PA
1160 - Strontium	EPA 6010B	10155609	NELAP	PA
1165 - Thallium	EPA 6010B	10155609	NELAP	PA
1175 - Tin	EPA 6010B	10155609	NELAP	PA
1180 - Titanium	EPA 6010B	10155609	NELAP	PA
1185 - Vanadium	EPA 6010B	10155609	NELAP	PA
1190 - Zinc	EPA 6010B	10155609	NELAP	PA
1000 - Aluminum	EPA 6010C	10155803	NELAP	PA
1005 - Antimony	EPA 6010C	10155803	NELAP	PA
1010 - Arsenic	EPA 6010C	10155803	NELAP	PA
1015 - Barium	EPA 6010C	10155803	NELAP	PA
1020 - Beryllium	EPA 6010C	10155803	NELAP	PA
1025 - Boron	EPA 6010C	10155803	NELAP	PA
1030 - Cadmium	EPA 6010C	10155803	NELAP	PA
1035 - Calcium	EPA 6010C	10155803	NELAP	PA
1040 - Chromium	EPA 6010C	10155803	NELAP	PA
1050 - Cobalt	EPA 6010C	10155803	NELAP	PA
1055 - Copper	EPA 6010C	10155803	NELAP	PA
1070 - Iron	EPA 6010C	10155803	NELAP	PA
1075 - Lead	EPA 6010C	10155803	NELAP	PA
1080 - Lithium	EPA 6010C	10155803	NELAP	PA
1085 - Magnesium	EPA 6010C	10155803	NELAP	PA
1090 - Manganese	EPA 6010C	10155803	NELAP	PA
1100 - Molybdenum	EPA 6010C	10155803	NELAP	PA
1105 - Nickel	EPA 6010C	10155803	NELAP	PA
1125 - Potassium	EPA 6010C	10155803	NELAP	PA
1140 - Selenium	EPA 6010C	10155803	NELAP	PA
1150 - Silver	EPA 6010C	10155803	NELAP	PA
1155 - Sodium	EPA 6010C	10155803	NELAP	PA
1160 - Strontium	EPA 6010C	10155803	NELAP	PA
2017 - Sulfur	EPA 6010C	10155803	NELAP	PA
1165 - Thallium	EPA 6010C	10155803	NELAP	PA
1175 - Tin	EPA 6010C	10155803	NELAP	PA
1180 - Titanium	EPA 6010C	10155803	NELAP	PA
1185 - Vanadium	EPA 6010C	10155803	NELAP	PA
1190 - Zinc	EPA 6010C	10155803	NELAP	PA
1000 - Aluminum	EPA 6020	10156000	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
1005 - Antimony	EPA 6020	10156000	NELAP	PA
1010 - Arsenic	EPA 6020	10156000	NELAP	PA
1015 - Barium	EPA 6020	10156000	NELAP	PA
1020 - Beryllium	EPA 6020	10156000	NELAP	PA
1030 - Cadmium	EPA 6020	10156000	NELAP	PA
1035 - Calcium	EPA 6020	10156000	NELAP	PA
1040 - Chromium	EPA 6020	10156000	NELAP	PA
1050 - Cobalt	EPA 6020	10156000	NELAP	PA
1055 - Copper	EPA 6020	10156000	NELAP	PA
1070 - Iron	EPA 6020	10156000	NELAP	PA
1075 - Lead	EPA 6020	10156000	NELAP	PA
1085 - Magnesium	EPA 6020	10156000	NELAP	PA
1090 - Manganese	EPA 6020	10156000	NELAP	PA
1100 - Molybdenum	EPA 6020	10156000	NELAP	PA
1105 - Nickel	EPA 6020	10156000	NELAP	PA
1125 - Potassium	EPA 6020	10156000	NELAP	PA
1140 - Selenium	EPA 6020	10156000	NELAP	PA
1150 - Silver	EPA 6020	10156000	NELAP	PA
1155 - Sodium	EPA 6020	10156000	NELAP	PA
1160 - Strontium	EPA 6020	10156000	NELAP	PA
1165 - Thallium	EPA 6020	10156000	NELAP	PA
1175 - Tin	EPA 6020	10156000	NELAP	PA
1185 - Vanadium	EPA 6020	10156000	NELAP	PA
1190 - Zinc	EPA 6020	10156000	NELAP	PA
1155 - Sodium	EPA 6020	10156204	NELAP	PA
1000 - Aluminum	EPA 6020A	10156408	NELAP	PA
1005 - Antimony	EPA 6020A	10156408	NELAP	PA
1010 - Arsenic	EPA 6020A	10156408	NELAP	PA
1015 - Barium	EPA 6020A	10156408	NELAP	PA
1020 - Beryllium	EPA 6020A	10156408	NELAP	PA
1030 - Cadmium	EPA 6020A	10156408	NELAP	PA
1035 - Calcium	EPA 6020A	10156408	NELAP	PA
1040 - Chromium	EPA 6020A	10156408	NELAP	PA
1050 - Cobalt	EPA 6020A	10156408	NELAP	PA
1055 - Copper	EPA 6020A	10156408	NELAP	PA
1070 - Iron	EPA 6020A	10156408	NELAP	PA
1075 - Lead	EPA 6020A	10156408	NELAP	PA
1085 - Magnesium	EPA 6020A	10156408	NELAP	PA
1090 - Manganese	EPA 6020A	10156408	NELAP	PA
1100 - Molybdenum	EPA 6020A	10156408	NELAP	PA
1105 - Nickel	EPA 6020A	10156408	NELAP	PA
1125 - Potassium	EPA 6020A	10156408	NELAP	PA
1140 - Selenium	EPA 6020A	10156408	NELAP	PA
1150 - Silver	EPA 6020A	10156408	NELAP	PA
1155 - Sodium	EPA 6020A	10156408	NELAP	PA
1160 - Strontium	EPA 6020A	10156408	NELAP	PA
1165 - Thallium	EPA 6020A	10156408	NELAP	PA
1175 - Tin	EPA 6020A	10156408	NELAP	PA
1180 - Titanium	EPA 6020A	10156408	NELAP	PA
1185 - Vanadium	EPA 6020A	10156408	NELAP	PA
1190 - Zinc	EPA 6020A	10156408	NELAP	PA
1045 - Chromium VI	EPA 7196A	10162400	NELAP	PA
1045 - Chromium VI	EPA 7199	10163005	NELAP	PA
1095 - Mercury	EPA 7471A	10166208	NELAP	PA
1095 - Mercury	EPA 7471B	10166402	NELAP	PA
9369 - Diesel range organics (DRO)	EPA 8015B	10173601	NELAP	PA

Eurofins Lancaster Laboratories Inc
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AI Number: 30729
Expiration Date: June 30, 2016

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Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
4750 - Ethanol	EPA 8015B	10173601	NELAP	PA
4785 - Ethylene glycol	EPA 8015B	10173601	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8015B	10173601	NELAP	PA
4895 - Isopropyl alcohol (2-Propanol, Isopropanol)	EPA 8015B	10173601	NELAP	PA
4930 - Methanol	EPA 8015B	10173601	NELAP	PA
9369 - Diesel range organics (DRO)	EPA 8015C	10173805	NELAP	PA
4750 - Ethanol	EPA 8015C	10173805	NELAP	PA
4785 - Ethylene glycol	EPA 8015C	10173805	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8015C	10173805	NELAP	PA
4895 - Isopropyl alcohol (2-Propanol, Isopropanol)	EPA 8015C	10173805	NELAP	PA
4930 - Methanol	EPA 8015C	10173805	NELAP	PA
4375 - Benzene	EPA 8021B	10174808	NELAP	PA
4765 - Ethylbenzene	EPA 8021B	10174808	NELAP	PA
4900 - Isopropylbenzene	EPA 8021B	10174808	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	EPA 8021B	10174808	NELAP	PA
5005 - Naphthalene	EPA 8021B	10174808	NELAP	PA
5140 - Toluene	EPA 8021B	10174808	NELAP	PA
5260 - Xylene (total)	EPA 8021B	10174808	NELAP	PA
5245 - m-Xylene	EPA 8021B	10174808	NELAP	PA
5250 - o-Xylene	EPA 8021B	10174808	NELAP	PA
5255 - p-Xylene	EPA 8021B	10174808	NELAP	PA
7355 - 4,4'-DDD	EPA 8081A	10178606	NELAP	PA
7360 - 4,4'-DDE	EPA 8081A	10178606	NELAP	PA
7365 - 4,4'-DDT	EPA 8081A	10178606	NELAP	PA
7025 - Aldrin	EPA 8081A	10178606	NELAP	PA
7250 - Chlordane (tech.)	EPA 8081A	10178606	NELAP	PA
7470 - Dieldrin	EPA 8081A	10178606	NELAP	PA
7510 - Endosulfan I	EPA 8081A	10178606	NELAP	PA
7515 - Endosulfan II	EPA 8081A	10178606	NELAP	PA
7520 - Endosulfan sulfate	EPA 8081A	10178606	NELAP	PA
7540 - Endrin	EPA 8081A	10178606	NELAP	PA
7530 - Endrin aldehyde	EPA 8081A	10178606	NELAP	PA
7535 - Endrin ketone	EPA 8081A	10178606	NELAP	PA
7685 - Heptachlor	EPA 8081A	10178606	NELAP	PA
7690 - Heptachlor epoxide	EPA 8081A	10178606	NELAP	PA
7740 - Kepone	EPA 8081A	10178606	NELAP	PA
7810 - Methoxychlor	EPA 8081A	10178606	NELAP	PA
7870 - Mirex	EPA 8081A	10178606	NELAP	PA
8250 - Toxaphene (Chlorinated camphene)	EPA 8081A	10178606	NELAP	PA
7110 - alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081A	10178606	NELAP	PA
7240 - alpha-Chlordane	EPA 8081A	10178606	NELAP	PA
7115 - beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081A	10178606	NELAP	PA
7105 - delta-BHC	EPA 8081A	10178606	NELAP	PA
7120 - gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	EPA 8081A	10178606	NELAP	PA
7245 - gamma-Chlordane	EPA 8081A	10178606	NELAP	PA
7355 - 4,4'-DDD	EPA 8081B	10178800	NELAP	PA
7360 - 4,4'-DDE	EPA 8081B	10178800	NELAP	PA
7365 - 4,4'-DDT	EPA 8081B	10178800	NELAP	PA
7025 - Aldrin	EPA 8081B	10178800	NELAP	PA
7250 - Chlordane (tech.)	EPA 8081B	10178800	NELAP	PA
7470 - Dieldrin	EPA 8081B	10178800	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
7510 - Endosulfan I	EPA 8081B	10178800	NELAP	PA
7515 - Endosulfan II	EPA 8081B	10178800	NELAP	PA
7520 - Endosulfan sulfate	EPA 8081B	10178800	NELAP	PA
7540 - Endrin	EPA 8081B	10178800	NELAP	PA
7530 - Endrin aldehyde	EPA 8081B	10178800	NELAP	PA
7535 - Endrin ketone	EPA 8081B	10178800	NELAP	PA
7685 - Heptachlor	EPA 8081B	10178800	NELAP	PA
7690 - Heptachlor epoxide	EPA 8081B	10178800	NELAP	PA
7740 - Kepone	EPA 8081B	10178800	NELAP	PA
7810 - Methoxychlor	EPA 8081B	10178800	NELAP	PA
7870 - Mirex	EPA 8081B	10178800	NELAP	PA
8250 - Toxaphene (Chlorinated camphene)	EPA 8081B	10178800	NELAP	PA
7110 - alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081B	10178800	NELAP	PA
7240 - alpha-Chlordane	EPA 8081B	10178800	NELAP	PA
7115 - beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081B	10178800	NELAP	PA
7105 - delta-BHC	EPA 8081B	10178800	NELAP	PA
7120 - gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	EPA 8081B	10178800	NELAP	PA
7245 - gamma-Chlordane	EPA 8081B	10178800	NELAP	PA
8880 - Aroclor-1016 (PCB-1016)	EPA 8082	10179007	NELAP	PA
8885 - Aroclor-1221 (PCB-1221)	EPA 8082	10179007	NELAP	PA
8890 - Aroclor-1232 (PCB-1232)	EPA 8082	10179007	NELAP	PA
8895 - Aroclor-1242 (PCB-1242)	EPA 8082	10179007	NELAP	PA
8900 - Aroclor-1248 (PCB-1248)	EPA 8082	10179007	NELAP	PA
8905 - Aroclor-1254 (PCB-1254)	EPA 8082	10179007	NELAP	PA
8910 - Aroclor-1260 (PCB-1260)	EPA 8082	10179007	NELAP	PA
8912 - Aroclor-1262 (PCB-1262)	EPA 8082	10179007	NELAP	PA
8913 - Aroclor-1268 (PCB-1268)	EPA 8082	10179007	NELAP	PA
8880 - Aroclor-1016 (PCB-1016)	EPA 8082A	10179201	NELAP	PA
8885 - Aroclor-1221 (PCB-1221)	EPA 8082A	10179201	NELAP	PA
8890 - Aroclor-1232 (PCB-1232)	EPA 8082A	10179201	NELAP	PA
8895 - Aroclor-1242 (PCB-1242)	EPA 8082A	10179201	NELAP	PA
8900 - Aroclor-1248 (PCB-1248)	EPA 8082A	10179201	NELAP	PA
8905 - Aroclor-1254 (PCB-1254)	EPA 8082A	10179201	NELAP	PA
8910 - Aroclor-1260 (PCB-1260)	EPA 8082A	10179201	NELAP	PA
8912 - Aroclor-1262 (PCB-1262)	EPA 8082A	10179201	NELAP	PA
8913 - Aroclor-1268 (PCB-1268)	EPA 8082A	10179201	NELAP	PA
7600 - Fensulfothion	EPA 8141	10181803	NELAP	PA
7785 - Merphos	EPA 8141	10181803	NELAP	PA
8140 - Stirophos	EPA 8141	10181803	NELAP	PA
7005 - Alachlor	EPA 8141A	10182000	NELAP	PA
7065 - Atrazine	EPA 8141A	10182000	NELAP	PA
7075 - Azinphos-methyl (Guthion)	EPA 8141A	10182000	NELAP	PA
7125 - Bolstar (Sulprofos)	EPA 8141A	10182000	NELAP	PA
7220 - Carbophenothion	EPA 8141A	10182000	NELAP	PA
7300 - Chlorpyrifos	EPA 8141A	10182000	NELAP	PA
7395 - Demeton-o	EPA 8141A	10182000	NELAP	PA
7385 - Demeton-s	EPA 8141A	10182000	NELAP	PA
7410 - Diazinon	EPA 8141A	10182000	NELAP	PA
8610 - Dichlorovos (DDVP, Dichlorvos)	EPA 8141A	10182000	NELAP	PA
8625 - Disulfoton	EPA 8141A	10182000	NELAP	PA
7550 - EPN	EPA 8141A	10182000	NELAP	PA
7565 - Ethion	EPA 8141A	10182000	NELAP	PA
7570 - Ethoprop	EPA 8141A	10182000	NELAP	PA

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Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
7580 - Famphur	EPA 8141A	10182000	NELAP	PA
7600 - Fensulfothion	EPA 8141A	10182000	NELAP	PA
7605 - Fenthion	EPA 8141A	10182000	NELAP	PA
7770 - Malathion	EPA 8141A	10182000	NELAP	PA
7785 - Merphos	EPA 8141A	10182000	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8141A	10182000	NELAP	PA
7850 - Mevinphos	EPA 8141A	10182000	NELAP	PA
7905 - Naled	EPA 8141A	10182000	NELAP	PA
7955 - Parathion, ethyl	EPA 8141A	10182000	NELAP	PA
7985 - Phorate	EPA 8141A	10182000	NELAP	PA
8110 - Ronnel	EPA 8141A	10182000	NELAP	PA
8125 - Simazine	EPA 8141A	10182000	NELAP	PA
8140 - Stirophos	EPA 8141A	10182000	NELAP	PA
7005 - Alachlor	EPA 8141B	10182204	NELAP	PA
7065 - Atrazine	EPA 8141B	10182204	NELAP	PA
7075 - Azinphos-methyl (Guthion)	EPA 8141B	10182204	NELAP	PA
7125 - Bolstar (Sulprofos)	EPA 8141B	10182204	NELAP	PA
7220 - Carbophenothion	EPA 8141B	10182204	NELAP	PA
7300 - Chlorpyrifos	EPA 8141B	10182204	NELAP	PA
7395 - Demeton-o	EPA 8141B	10182204	NELAP	PA
7385 - Demeton-s	EPA 8141B	10182204	NELAP	PA
7410 - Diazinon	EPA 8141B	10182204	NELAP	PA
8610 - Dichlorovos (DDVP, Dichlorvos)	EPA 8141B	10182204	NELAP	PA
8625 - Disulfoton	EPA 8141B	10182204	NELAP	PA
7550 - EPN	EPA 8141B	10182204	NELAP	PA
7565 - Ethion	EPA 8141B	10182204	NELAP	PA
7570 - Ethoprop	EPA 8141B	10182204	NELAP	PA
7580 - Famphur	EPA 8141B	10182204	NELAP	PA
7600 - Fensulfothion	EPA 8141B	10182204	NELAP	PA
7605 - Fenthion	EPA 8141B	10182204	NELAP	PA
7770 - Malathion	EPA 8141B	10182204	NELAP	PA
7785 - Merphos	EPA 8141B	10182204	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8141B	10182204	NELAP	PA
7850 - Mevinphos	EPA 8141B	10182204	NELAP	PA
7905 - Naled	EPA 8141B	10182204	NELAP	PA
7955 - Parathion, ethyl	EPA 8141B	10182204	NELAP	PA
7985 - Phorate	EPA 8141B	10182204	NELAP	PA
8110 - Ronnel	EPA 8141B	10182204	NELAP	PA
8125 - Simazine	EPA 8141B	10182204	NELAP	PA
8655 - 2,4,5-T	EPA 8151	10183003	NELAP	PA
8545 - 2,4-D	EPA 8151	10183003	NELAP	PA
8560 - 2,4-DB	EPA 8151	10183003	NELAP	PA
8555 - Dalapon	EPA 8151	10183003	NELAP	PA
8595 - Dicamba	EPA 8151	10183003	NELAP	PA
8605 - Dichloroprop (Dichlorprop)	EPA 8151	10183003	NELAP	PA
8620 - Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	10183003	NELAP	PA
7775 - MCPA	EPA 8151	10183003	NELAP	PA
7780 - MCPP	EPA 8151	10183003	NELAP	PA
6605 - Pentachlorophenol	EPA 8151	10183003	NELAP	PA
8645 - Picloram	EPA 8151	10183003	NELAP	PA
8650 - Silvex (2,4,5-TP)	EPA 8151	10183003	NELAP	PA
8655 - 2,4,5-T	EPA 8151A	10183207	NELAP	PA
8545 - 2,4-D	EPA 8151A	10183207	NELAP	PA
8560 - 2,4-DB	EPA 8151A	10183207	NELAP	PA
8555 - Dalapon	EPA 8151A	10183207	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
8595 - Dicamba	EPA 8151A	10183207	NELAP	PA
8605 - Dichloroprop (Dichlorprop)	EPA 8151A	10183207	NELAP	PA
8620 - Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151A	10183207	NELAP	PA
7775 - MCPA	EPA 8151A	10183207	NELAP	PA
7780 - MCPP	EPA 8151A	10183207	NELAP	PA
6605 - Pentachlorophenol	EPA 8151A	10183207	NELAP	PA
8645 - Picloram	EPA 8151A	10183207	NELAP	PA
8650 - Silvex (2,4,5-TP)	EPA 8151A	10183207	NELAP	PA
5105 - 1,1,1,2-Tetrachloroethane	EPA 8260	10184404	NELAP	PA
5160 - 1,1,1-Trichloroethane	EPA 8260	10184404	NELAP	PA
5110 - 1,1,2,2-Tetrachloroethane	EPA 8260	10184404	NELAP	PA
5185 - 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 8260	10184404	NELAP	PA
5165 - 1,1,2-Trichloroethane	EPA 8260	10184404	NELAP	PA
4630 - 1,1-Dichloroethane	EPA 8260	10184404	NELAP	PA
4640 - 1,1-Dichloroethylene	EPA 8260	10184404	NELAP	PA
4670 - 1,1-Dichloropropene	EPA 8260	10184404	NELAP	PA
5150 - 1,2,3-Trichlorobenzene	EPA 8260	10184404	NELAP	PA
5180 - 1,2,3-Trichloropropane	EPA 8260	10184404	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8260	10184404	NELAP	PA
5210 - 1,2,4-Trimethylbenzene	EPA 8260	10184404	NELAP	PA
4570 - 1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	10184404	NELAP	PA
4585 - 1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	10184404	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8260	10184404	NELAP	PA
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA 8260	10184404	NELAP	PA
4655 - 1,2-Dichloropropane	EPA 8260	10184404	NELAP	PA
5215 - 1,3,5-Trimethylbenzene	EPA 8260	10184404	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8260	10184404	NELAP	PA
4660 - 1,3-Dichloropropane	EPA 8260	10184404	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8260	10184404	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260	10184404	NELAP	PA
4665 - 2,2-Dichloropropane	EPA 8260	10184404	NELAP	PA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	10184404	NELAP	PA
4500 - 2-Chloroethyl vinyl ether	EPA 8260	10184404	NELAP	PA
4535 - 2-Chlorotoluene	EPA 8260	10184404	NELAP	PA
4860 - 2-Hexanone	EPA 8260	10184404	NELAP	PA
4540 - 4-Chlorotoluene	EPA 8260	10184404	NELAP	PA
4910 - 4-Isopropyltoluene (p-Cymene)	EPA 8260	10184404	NELAP	PA
4995 - 4-Methyl-2-pentanone (MIBK)	EPA 8260	10184404	NELAP	PA
4315 - Acetone	EPA 8260	10184404	NELAP	PA
4320 - Acetonitrile	EPA 8260	10184404	NELAP	PA
4325 - Acrolein (Propenal)	EPA 8260	10184404	NELAP	PA
4340 - Acrylonitrile	EPA 8260	10184404	NELAP	PA
4355 - Allyl chloride (3-Chloropropene)	EPA 8260	10184404	NELAP	PA
4375 - Benzene	EPA 8260	10184404	NELAP	PA
5635 - Benzyl chloride	EPA 8260	10184404	NELAP	PA
4385 - Bromobenzene	EPA 8260	10184404	NELAP	PA
4390 - Bromochloromethane	EPA 8260	10184404	NELAP	PA
4395 - Bromodichloromethane	EPA 8260	10184404	NELAP	PA
4400 - Bromoform	EPA 8260	10184404	NELAP	PA
4450 - Carbon disulfide	EPA 8260	10184404	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
4455 - Carbon tetrachloride	EPA 8260	10184404	NELAP	PA
4475 - Chlorobenzene	EPA 8260	10184404	NELAP	PA
4575 - Chlorodibromomethane	EPA 8260	10184404	NELAP	PA
4485 - Chloroethane (Ethyl chloride)	EPA 8260	10184404	NELAP	PA
4505 - Chloroform	EPA 8260	10184404	NELAP	PA
4525 - Chloroprene (2-Chloro-1,3-butadiene)	EPA 8260	10184404	NELAP	PA
4555 - Cyclohexane	EPA 8260	10184404	NELAP	PA
9375 - Di-isopropylether (DIPE) (Isopropyl ether)	EPA 8260	10184404	NELAP	PA
4580 - Dibromochloropropane	EPA 8260	10184404	NELAP	PA
4595 - Dibromomethane (Methylene bromide)	EPA 8260	10184404	NELAP	PA
4625 - Dichlorodifluoromethane (Freon-12)	EPA 8260	10184404	NELAP	PA
4750 - Ethanol	EPA 8260	10184404	NELAP	PA
4755 - Ethyl acetate	EPA 8260	10184404	NELAP	PA
4810 - Ethyl methacrylate	EPA 8260	10184404	NELAP	PA
4770 - Ethyl-t-butyl ether (ETBE) (2-Ethoxy-2-methylpropane)	EPA 8260	10184404	NELAP	PA
4765 - Ethylbenzene	EPA 8260	10184404	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8260	10184404	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8260	10184404	NELAP	PA
4875 - Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260	10184404	NELAP	PA
4895 - Isopropyl alcohol (2-Propanol, Isopropanol)	EPA 8260	10184404	NELAP	PA
4900 - Isopropylbenzene	EPA 8260	10184404	NELAP	PA
4925 - Methacrylonitrile	EPA 8260	10184404	NELAP	PA
4950 - Methyl bromide (Bromomethane)	EPA 8260	10184404	NELAP	PA
4960 - Methyl chloride (Chloromethane)	EPA 8260	10184404	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	EPA 8260	10184404	NELAP	PA
4965 - Methylcyclohexane	EPA 8260	10184404	NELAP	PA
4975 - Methylene chloride (Dichloromethane)	EPA 8260	10184404	NELAP	PA
5005 - Naphthalene	EPA 8260	10184404	NELAP	PA
5035 - Pentachloroethane	EPA 8260	10184404	NELAP	PA
5080 - Propionitrile (Ethyl cyanide)	EPA 8260	10184404	NELAP	PA
5100 - Styrene	EPA 8260	10184404	NELAP	PA
4370 - T-amylmethylether (TAME)	EPA 8260	10184404	NELAP	PA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA 8260	10184404	NELAP	PA
5140 - Toluene	EPA 8260	10184404	NELAP	PA
5170 - Trichloroethene (Trichloroethylene)	EPA 8260	10184404	NELAP	PA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA 8260	10184404	NELAP	PA
5225 - Vinyl acetate	EPA 8260	10184404	NELAP	PA
5235 - Vinyl chloride	EPA 8260	10184404	NELAP	PA
5260 - Xylene (total)	EPA 8260	10184404	NELAP	PA
4680 - cis-1,3-Dichloropropene	EPA 8260	10184404	NELAP	PA
5240 - m+p-xylene	EPA 8260	10184404	NELAP	PA
4425 - n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8260	10184404	NELAP	PA
4435 - n-Butylbenzene	EPA 8260	10184404	NELAP	PA
5090 - n-Propylbenzene	EPA 8260	10184404	NELAP	PA
5250 - o-Xylene	EPA 8260	10184404	NELAP	PA
4440 - sec-Butylbenzene	EPA 8260	10184404	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
4420 - tert-Butyl alcohol	EPA 8260	10184404	NELAP	PA
4445 - tert-Butylbenzene	EPA 8260	10184404	NELAP	PA
4700 - trans-1,2-Dichloroethylene	EPA 8260	10184404	NELAP	PA
4685 - trans-1,3-Dichloropropylene	EPA 8260	10184404	NELAP	PA
4605 - trans-1,4-Dichloro-2-butene	EPA 8260	10184404	NELAP	PA
5105 - 1,1,1,2-Tetrachloroethane	EPA 8260B	10184802	NELAP	PA
5160 - 1,1,1-Trichloroethane	EPA 8260B	10184802	NELAP	PA
5110 - 1,1,2,2-Tetrachloroethane	EPA 8260B	10184802	NELAP	PA
5195 - 1,1,2-Trichloro-1,2,2-trifluoroethane	EPA 8260B	10184802	NELAP	PA
5185 - 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 8260B	10184802	NELAP	PA
5165 - 1,1,2-Trichloroethane	EPA 8260B	10184802	NELAP	PA
4630 - 1,1-Dichloroethane	EPA 8260B	10184802	NELAP	PA
4640 - 1,1-Dichloroethylene	EPA 8260B	10184802	NELAP	PA
4670 - 1,1-Dichloropropene	EPA 8260B	10184802	NELAP	PA
5150 - 1,2,3-Trichlorobenzene	EPA 8260B	10184802	NELAP	PA
5180 - 1,2,3-Trichloropropane	EPA 8260B	10184802	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8260B	10184802	NELAP	PA
5210 - 1,2,4-Trimethylbenzene	EPA 8260B	10184802	NELAP	PA
4570 - 1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260B	10184802	NELAP	PA
4585 - 1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260B	10184802	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8260B	10184802	NELAP	PA
4635 - 1,2-Dichloroethane (Ethylene dichloride)	EPA 8260B	10184802	NELAP	PA
4655 - 1,2-Dichloropropane	EPA 8260B	10184802	NELAP	PA
5215 - 1,3,5-Trimethylbenzene	EPA 8260B	10184802	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8260B	10184802	NELAP	PA
4660 - 1,3-Dichloropropane	EPA 8260B	10184802	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8260B	10184802	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260B	10184802	NELAP	PA
4665 - 2,2-Dichloropropane	EPA 8260B	10184802	NELAP	PA
4410 - 2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260B	10184802	NELAP	PA
4500 - 2-Chloroethyl vinyl ether	EPA 8260B	10184802	NELAP	PA
4535 - 2-Chlorotoluene	EPA 8260B	10184802	NELAP	PA
4860 - 2-Hexanone	EPA 8260B	10184802	NELAP	PA
4368 - 2-methyl-2-butanol (tert-Amyl alcohol)	EPA 8260B	10184802	NELAP	PA
4540 - 4-Chlorotoluene	EPA 8260B	10184802	NELAP	PA
4910 - 4-Isopropyltoluene (p-Cymene)	EPA 8260B	10184802	NELAP	PA
4995 - 4-Methyl-2-pentanone (MIBK)	EPA 8260B	10184802	NELAP	PA
4315 - Acetone	EPA 8260B	10184802	NELAP	PA
4320 - Acetonitrile	EPA 8260B	10184802	NELAP	PA
4325 - Acrolein (Propenal)	EPA 8260B	10184802	NELAP	PA
4340 - Acrylonitrile	EPA 8260B	10184802	NELAP	PA
4355 - Allyl chloride (3-Chloropropene)	EPA 8260B	10184802	NELAP	PA
4375 - Benzene	EPA 8260B	10184802	NELAP	PA
5635 - Benzyl chloride	EPA 8260B	10184802	NELAP	PA
4380 - Bromoacetone	EPA 8260B	10184802	NELAP	PA
4385 - Bromobenzene	EPA 8260B	10184802	NELAP	PA
4390 - Bromochloromethane	EPA 8260B	10184802	NELAP	PA
4395 - Bromodichloromethane	EPA 8260B	10184802	NELAP	PA
4400 - Bromoform	EPA 8260B	10184802	NELAP	PA
4450 - Carbon disulfide	EPA 8260B	10184802	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
4455 - Carbon tetrachloride	EPA 8260B	10184802	NELAP	PA
4475 - Chlorobenzene	EPA 8260B	10184802	NELAP	PA
4575 - Chlorodibromomethane	EPA 8260B	10184802	NELAP	PA
4485 - Chloroethane (Ethyl chloride)	EPA 8260B	10184802	NELAP	PA
4505 - Chloroform	EPA 8260B	10184802	NELAP	PA
4525 - Chloroprene (2-Chloro-1,3-butadiene)	EPA 8260B	10184802	NELAP	PA
4555 - Cyclohexane	EPA 8260B	10184802	NELAP	PA
4560 - Cyclohexanone	EPA 8260B	10184802	NELAP	PA
9375 - Di-isopropylether (DIPE) (Isopropyl ether)	EPA 8260B	10184802	NELAP	PA
4580 - Dibromochloropropane	EPA 8260B	10184802	NELAP	PA
4595 - Dibromomethane (Methylene bromide)	EPA 8260B	10184802	NELAP	PA
4625 - Dichlorodifluoromethane (Freon-12)	EPA 8260B	10184802	NELAP	PA
4745 - Epichlorohydrin (1-Chloro-2,3-epoxypropane)	EPA 8260B	10184802	NELAP	PA
4750 - Ethanol	EPA 8260B	10184802	NELAP	PA
4755 - Ethyl acetate	EPA 8260B	10184802	NELAP	PA
4810 - Ethyl methacrylate	EPA 8260B	10184802	NELAP	PA
4770 - Ethyl-t-butyl ether (ETBE) (2-Ethoxy-2-methylpropane)	EPA 8260B	10184802	NELAP	PA
4765 - Ethylbenzene	EPA 8260B	10184802	NELAP	PA
9408 - Gasoline range organics (GRO)	EPA 8260B	10184802	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8260B	10184802	NELAP	PA
4870 - Iodomethane (Methyl iodide)	EPA 8260B	10184802	NELAP	PA
4875 - Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260B	10184802	NELAP	PA
4895 - Isopropyl alcohol (2-Propanol, Isopropanol)	EPA 8260B	10184802	NELAP	PA
4900 - Isopropylbenzene	EPA 8260B	10184802	NELAP	PA
4925 - Methacrylonitrile	EPA 8260B	10184802	NELAP	PA
4940 - Methyl acetate	EPA 8260B	10184802	NELAP	PA
4950 - Methyl bromide (Bromomethane)	EPA 8260B	10184802	NELAP	PA
4960 - Methyl chloride (Chloromethane)	EPA 8260B	10184802	NELAP	PA
5000 - Methyl tert-butyl ether (MTBE)	EPA 8260B	10184802	NELAP	PA
4965 - Methylcyclohexane	EPA 8260B	10184802	NELAP	PA
4975 - Methylene chloride (Dichloromethane)	EPA 8260B	10184802	NELAP	PA
5005 - Naphthalene	EPA 8260B	10184802	NELAP	PA
5035 - Pentachloroethane	EPA 8260B	10184802	NELAP	PA
5080 - Propionitrile (Ethyl cyanide)	EPA 8260B	10184802	NELAP	PA
5100 - Styrene	EPA 8260B	10184802	NELAP	PA
4370 - T-amylmethylether (TAME)	EPA 8260B	10184802	NELAP	PA
5115 - Tetrachloroethylene (Perchloroethylene)	EPA 8260B	10184802	NELAP	PA
5140 - Toluene	EPA 8260B	10184802	NELAP	PA
5170 - Trichloroethene (Trichloroethylene)	EPA 8260B	10184802	NELAP	PA
5175 - Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	EPA 8260B	10184802	NELAP	PA
5225 - Vinyl acetate	EPA 8260B	10184802	NELAP	PA
5235 - Vinyl chloride	EPA 8260B	10184802	NELAP	PA
5260 - Xylene (total)	EPA 8260B	10184802	NELAP	PA
4705 - cis & trans-1,2-Dichloroethene	EPA 8260B	10184802	NELAP	PA
4645 - cis-1,2-Dichloroethylene	EPA 8260B	10184802	NELAP	PA
4680 - cis-1,3-Dichloropropene	EPA 8260B	10184802	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
5240 - m+p-xylene	EPA 8260B	10184802	NELAP	PA
4425 - n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8260B	10184802	NELAP	PA
4435 - n-Butylbenzene	EPA 8260B	10184802	NELAP	PA
5090 - n-Propylbenzene	EPA 8260B	10184802	NELAP	PA
5250 - o-Xylene	EPA 8260B	10184802	NELAP	PA
4440 - sec-Butylbenzene	EPA 8260B	10184802	NELAP	PA
4420 - tert-Butyl alcohol	EPA 8260B	10184802	NELAP	PA
4445 - tert-Butylbenzene	EPA 8260B	10184802	NELAP	PA
4700 - trans-1,2-Dichloroethylene	EPA 8260B	10184802	NELAP	PA
4685 - trans-1,3-Dichloropropylene	EPA 8260B	10184802	NELAP	PA
4605 - trans-1,4-Dichloro-2-butene	EPA 8260B	10184802	NELAP	PA
5510 - Acetophenone	EPA 8270	10185203	NELAP	PA
5560 - Aramite	EPA 8270	10185203	NELAP	PA
5900 - Dibenz(a, j) acridine	EPA 8270	10185203	NELAP	PA
5765 - bis(2-Chloroethyl) ether	EPA 8270	10185203	NELAP	PA
6550 - n-Nitrosomethylethylamine	EPA 8270	10185203	NELAP	PA
6703 - 1,1'-Biphenyl (BZ-0)	EPA 8270C	10185805	NELAP	PA
6705 - 1,2,3,4-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	PA
6710 - 1,2,3,5-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	PA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 8270C	10185805	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8270C	10185805	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8270C	10185805	NELAP	PA
6155 - 1,2-Dinitrobenzene	EPA 8270C	10185805	NELAP	PA
6220 - 1,2-Diphenylhydrazine	EPA 8270C	10185805	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270C	10185805	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8270C	10185805	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8270C	10185805	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8270C	10185805	NELAP	PA
6165 - 1,4-Dinitrobenzene	EPA 8270C	10185805	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8270C	10185805	NELAP	PA
6420 - 1,4-Naphthoquinone	EPA 8270C	10185805	NELAP	PA
6630 - 1,4-Phenylenediamine	EPA 8270C	10185805	NELAP	PA
5790 - 1-Chloronaphthalene	EPA 8270C	10185805	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270C	10185805	NELAP	PA
6425 - 1-Naphthylamine	EPA 8270C	10185805	NELAP	PA
6735 - 2,3,4,6-Tetrachlorophenol	EPA 8270C	10185805	NELAP	PA
6835 - 2,4,5-Trichlorophenol	EPA 8270C	10185805	NELAP	PA
6840 - 2,4,6-Trichlorophenol	EPA 8270C	10185805	NELAP	PA
6000 - 2,4-Dichlorophenol	EPA 8270C	10185805	NELAP	PA
6130 - 2,4-Dimethylphenol	EPA 8270C	10185805	NELAP	PA
6175 - 2,4-Dinitrophenol	EPA 8270C	10185805	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8270C	10185805	NELAP	PA
6005 - 2,6-Dichlorophenol	EPA 8270C	10185805	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8270C	10185805	NELAP	PA
5515 - 2-Acetylaminofluorene	EPA 8270C	10185805	NELAP	PA
5795 - 2-Chloronaphthalene	EPA 8270C	10185805	NELAP	PA
5800 - 2-Chlorophenol	EPA 8270C	10185805	NELAP	PA
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	EPA 8270C	10185805	NELAP	PA
5145 - 2-Methylaniline (o-Toluidine)	EPA 8270C	10185805	NELAP	PA
6385 - 2-Methylnaphthalene	EPA 8270C	10185805	NELAP	PA
6400 - 2-Methylphenol (o-Cresol)	EPA 8270C	10185805	NELAP	PA
6430 - 2-Naphthylamine	EPA 8270C	10185805	NELAP	PA
6460 - 2-Nitroaniline	EPA 8270C	10185805	NELAP	PA
6490 - 2-Nitrophenol	EPA 8270C	10185805	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
5050 - 2-Picoline (2-Methylpyridine)	EPA 8270C	10185805	NELAP	PA
6412 - 3+4 Methylphenol	EPA 8270C	10185805	NELAP	PA
5945 - 3,3'-Dichlorobenzidine	EPA 8270C	10185805	NELAP	PA
6100 - 3,3'-Dimethoxybenzidine	EPA 8270C	10185805	NELAP	PA
6120 - 3,3'-Dimethylbenzidine	EPA 8270C	10185805	NELAP	PA
6355 - 3-Methylcholanthrene	EPA 8270C	10185805	NELAP	PA
6405 - 3-Methylphenol (m-Cresol)	EPA 8270C	10185805	NELAP	PA
6465 - 3-Nitroaniline	EPA 8270C	10185805	NELAP	PA
6365 - 4,4'-Methylenebis(2-chloroaniline)	EPA 8270C	10185805	NELAP	PA
5540 - 4-Aminobiphenyl	EPA 8270C	10185805	NELAP	PA
5660 - 4-Bromophenyl phenyl ether	EPA 8270C	10185805	NELAP	PA
5700 - 4-Chloro-3-methylphenol	EPA 8270C	10185805	NELAP	PA
5745 - 4-Chloroaniline	EPA 8270C	10185805	NELAP	PA
5825 - 4-Chlorophenyl phenylether	EPA 8270C	10185805	NELAP	PA
6410 - 4-Methylphenol (p-Cresol)	EPA 8270C	10185805	NELAP	PA
6470 - 4-Nitroaniline	EPA 8270C	10185805	NELAP	PA
6500 - 4-Nitrophenol	EPA 8270C	10185805	NELAP	PA
6510 - 4-Nitroquinoline 1-oxide	EPA 8270C	10185805	NELAP	PA
6570 - 5-Nitro-o-toluidine	EPA 8270C	10185805	NELAP	PA
6115 - 7,12-Dimethylbenz(a) anthracene	EPA 8270C	10185805	NELAP	PA
5500 - Acenaphthene	EPA 8270C	10185805	NELAP	PA
5505 - Acenaphthylene	EPA 8270C	10185805	NELAP	PA
5510 - Acetophenone	EPA 8270C	10185805	NELAP	PA
4330 - Acrylamide	EPA 8270C	10185805	NELAP	PA
5545 - Aniline	EPA 8270C	10185805	NELAP	PA
5555 - Anthracene	EPA 8270C	10185805	NELAP	PA
5560 - Aramite	EPA 8270C	10185805	NELAP	PA
7065 - Atrazine	EPA 8270C	10185805	NELAP	PA
5570 - Benzaldehyde	EPA 8270C	10185805	NELAP	PA
5567 - Benzenethiol	EPA 8270C	10185805	NELAP	PA
5595 - Benzidine	EPA 8270C	10185805	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270C	10185805	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270C	10185805	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270C	10185805	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270C	10185805	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270C	10185805	NELAP	PA
5610 - Benzoic acid	EPA 8270C	10185805	NELAP	PA
5630 - Benzyl alcohol	EPA 8270C	10185805	NELAP	PA
5670 - Butyl benzyl phthalate	EPA 8270C	10185805	NELAP	PA
7180 - Caprolactam	EPA 8270C	10185805	NELAP	PA
5680 - Carbazole	EPA 8270C	10185805	NELAP	PA
7260 - Chlorobenzilate	EPA 8270C	10185805	NELAP	PA
5855 - Chrysene	EPA 8270C	10185805	NELAP	PA
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	EPA 8270C	10185805	NELAP	PA
5925 - Di-n-butyl phthalate	EPA 8270C	10185805	NELAP	PA
6200 - Di-n-octyl phthalate	EPA 8270C	10185805	NELAP	PA
7405 - Diallate	EPA 8270C	10185805	NELAP	PA
9354 - Dibenz(a, h) acridine	EPA 8270C	10185805	NELAP	PA
5900 - Dibenz(a, j) acridine	EPA 8270C	10185805	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270C	10185805	NELAP	PA
5905 - Dibenzofuran	EPA 8270C	10185805	NELAP	PA
6070 - Diethyl phthalate	EPA 8270C	10185805	NELAP	PA
7475 - Dimethoate	EPA 8270C	10185805	NELAP	PA
6135 - Dimethyl phthalate	EPA 8270C	10185805	NELAP	PA
8620 - Dinoseb (2-sec-butyl-4,6-	EPA 8270C	10185805	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
dinitrophenol, DNBP)				
6205 - Diphenylamine	EPA 8270C	10185805	NELAP	PA
8625 - Disulfoton	EPA 8270C	10185805	NELAP	PA
6260 - Ethyl methanesulfonate	EPA 8270C	10185805	NELAP	PA
7580 - Famphur	EPA 8270C	10185805	NELAP	PA
6265 - Fluoranthene	EPA 8270C	10185805	NELAP	PA
6270 - Fluorene	EPA 8270C	10185805	NELAP	PA
6275 - Hexachlorobenzene	EPA 8270C	10185805	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8270C	10185805	NELAP	PA
6285 - Hexachlorocyclopentadiene	EPA 8270C	10185805	NELAP	PA
4840 - Hexachloroethane	EPA 8270C	10185805	NELAP	PA
6295 - Hexachloropropene	EPA 8270C	10185805	NELAP	PA
6312 - Indene	EPA 8270C	10185805	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270C	10185805	NELAP	PA
7725 - Isodrin	EPA 8270C	10185805	NELAP	PA
6320 - Isophorone	EPA 8270C	10185805	NELAP	PA
6325 - Isosafrole	EPA 8270C	10185805	NELAP	PA
7740 - Kepone	EPA 8270C	10185805	NELAP	PA
6345 - Methapyrilene	EPA 8270C	10185805	NELAP	PA
6375 - Methyl methanesulfonate	EPA 8270C	10185805	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8270C	10185805	NELAP	PA
5005 - Naphthalene	EPA 8270C	10185805	NELAP	PA
5015 - Nitrobenzene	EPA 8270C	10185805	NELAP	PA
7955 - Parathion, ethyl	EPA 8270C	10185805	NELAP	PA
6590 - Pentachlorobenzene	EPA 8270C	10185805	NELAP	PA
6600 - Pentachloronitrobenzene	EPA 8270C	10185805	NELAP	PA
6605 - Pentachlorophenol	EPA 8270C	10185805	NELAP	PA
6610 - Phenacetin	EPA 8270C	10185805	NELAP	PA
6615 - Phenanthrene	EPA 8270C	10185805	NELAP	PA
6625 - Phenol	EPA 8270C	10185805	NELAP	PA
7985 - Phorate	EPA 8270C	10185805	NELAP	PA
6640 - Phthalic anhydride	EPA 8270C	10185805	NELAP	PA
6650 - Pronamide (Kerb)	EPA 8270C	10185805	NELAP	PA
6665 - Pyrene	EPA 8270C	10185805	NELAP	PA
5095 - Pyridine	EPA 8270C	10185805	NELAP	PA
6670 - Quinoline	EPA 8270C	10185805	NELAP	PA
6685 - Safrole	EPA 8270C	10185805	NELAP	PA
8235 - Thionazin (Zinophos)	EPA 8270C	10185805	NELAP	PA
6125 - a-a-Dimethylphenethylamine	EPA 8270C	10185805	NELAP	PA
5760 - bis(2-Chloroethoxy)methane	EPA 8270C	10185805	NELAP	PA
5765 - bis(2-Chloroethyl) ether	EPA 8270C	10185805	NELAP	PA
5780 - bis(2-Chloroisopropyl) ether	EPA 8270C	10185805	NELAP	PA
6245 - bis(2-Ethoxyethyl) phthalate	EPA 8270C	10185805	NELAP	PA
6062 - bis(2-Ethylhexyl)adipate	EPA 8270C	10185805	NELAP	PA
5025 - n-Nitroso-di-n-butylamine	EPA 8270C	10185805	NELAP	PA
6545 - n-Nitrosodi-n-propylamine	EPA 8270C	10185805	NELAP	PA
6525 - n-Nitrosodiethylamine	EPA 8270C	10185805	NELAP	PA
6530 - n-Nitrosodimethylamine	EPA 8270C	10185805	NELAP	PA
6535 - n-Nitrosodiphenylamine	EPA 8270C	10185805	NELAP	PA
6550 - n-Nitrosomethylethylamine	EPA 8270C	10185805	NELAP	PA
6555 - n-Nitrosomorpholine	EPA 8270C	10185805	NELAP	PA
6560 - n-Nitrosopiperidine	EPA 8270C	10185805	NELAP	PA
6565 - n-Nitrosopyrrolidine	EPA 8270C	10185805	NELAP	PA
8290 - o,o,o-Triethyl phosphorothioate	EPA 8270C	10185805	NELAP	PA
8310 - tris-(2,3-Dibromopropyl) phosphate (tris-BP)	EPA 8270C	10185805	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
6703 - 1,1'-Biphenyl (BZ-0)	EPA 8270D	10186002	NELAP	PA
6705 - 1,2,3,4-Tetrachlorobenzene	EPA 8270D	10186002	NELAP	PA
6710 - 1,2,3,5-Tetrachlorobenzene	EPA 8270D	10186002	NELAP	PA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 8270D	10186002	NELAP	PA
5155 - 1,2,4-Trichlorobenzene	EPA 8270D	10186002	NELAP	PA
4610 - 1,2-Dichlorobenzene	EPA 8270D	10186002	NELAP	PA
6155 - 1,2-Dinitrobenzene	EPA 8270D	10186002	NELAP	PA
6220 - 1,2-Diphenylhydrazine	EPA 8270D	10186002	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270D	10186002	NELAP	PA
4615 - 1,3-Dichlorobenzene	EPA 8270D	10186002	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8270D	10186002	NELAP	PA
4620 - 1,4-Dichlorobenzene	EPA 8270D	10186002	NELAP	PA
6165 - 1,4-Dinitrobenzene	EPA 8270D	10186002	NELAP	PA
4735 - 1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8270D	10186002	NELAP	PA
6420 - 1,4-Naphthoquinone	EPA 8270D	10186002	NELAP	PA
6630 - 1,4-Phenylenediamine	EPA 8270D	10186002	NELAP	PA
5790 - 1-Chloronaphthalene	EPA 8270D	10186002	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270D	10186002	NELAP	PA
6425 - 1-Naphthylamine	EPA 8270D	10186002	NELAP	PA
6735 - 2,3,4,6-Tetrachlorophenol	EPA 8270D	10186002	NELAP	PA
6835 - 2,4,5-Trichlorophenol	EPA 8270D	10186002	NELAP	PA
6840 - 2,4,6-Trichlorophenol	EPA 8270D	10186002	NELAP	PA
6000 - 2,4-Dichlorophenol	EPA 8270D	10186002	NELAP	PA
6130 - 2,4-Dimethylphenol	EPA 8270D	10186002	NELAP	PA
6175 - 2,4-Dinitrophenol	EPA 8270D	10186002	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D	10186002	NELAP	PA
6005 - 2,6-Dichlorophenol	EPA 8270D	10186002	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D	10186002	NELAP	PA
5515 - 2-Acetylaminofluorene	EPA 8270D	10186002	NELAP	PA
5795 - 2-Chloronaphthalene	EPA 8270D	10186002	NELAP	PA
5800 - 2-Chlorophenol	EPA 8270D	10186002	NELAP	PA
6360 - 2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	EPA 8270D	10186002	NELAP	PA
5145 - 2-Methylaniline (o-Toluidine)	EPA 8270D	10186002	NELAP	PA
6385 - 2-Methylnaphthalene	EPA 8270D	10186002	NELAP	PA
6400 - 2-Methylphenol (o-Cresol)	EPA 8270D	10186002	NELAP	PA
6430 - 2-Naphthylamine	EPA 8270D	10186002	NELAP	PA
6460 - 2-Nitroaniline	EPA 8270D	10186002	NELAP	PA
6490 - 2-Nitrophenol	EPA 8270D	10186002	NELAP	PA
5050 - 2-Picoline (2-Methylpyridine)	EPA 8270D	10186002	NELAP	PA
6412 - 3+4 Methylphenol	EPA 8270D	10186002	NELAP	PA
5945 - 3,3'-Dichlorobenzidine	EPA 8270D	10186002	NELAP	PA
6100 - 3,3'-Dimethoxybenzidine	EPA 8270D	10186002	NELAP	PA
6120 - 3,3'-Dimethylbenzidine	EPA 8270D	10186002	NELAP	PA
6355 - 3-Methylcholanthrene	EPA 8270D	10186002	NELAP	PA
6405 - 3-Methylphenol (m-Cresol)	EPA 8270D	10186002	NELAP	PA
6465 - 3-Nitroaniline	EPA 8270D	10186002	NELAP	PA
6365 - 4,4'-Methylenebis(2-chloroaniline)	EPA 8270D	10186002	NELAP	PA
5540 - 4-Aminobiphenyl	EPA 8270D	10186002	NELAP	PA
5660 - 4-Bromophenyl phenyl ether	EPA 8270D	10186002	NELAP	PA
5700 - 4-Chloro-3-methylphenol	EPA 8270D	10186002	NELAP	PA
5745 - 4-Chloroaniline	EPA 8270D	10186002	NELAP	PA
5825 - 4-Chlorophenyl phenylether	EPA 8270D	10186002	NELAP	PA
6410 - 4-Methylphenol (p-Cresol)	EPA 8270D	10186002	NELAP	PA
6470 - 4-Nitroaniline	EPA 8270D	10186002	NELAP	PA
6500 - 4-Nitrophenol	EPA 8270D	10186002	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
6510 - 4-Nitroquinoline 1-oxide	EPA 8270D	10186002	NELAP	PA
6570 - 5-Nitro-o-toluidine	EPA 8270D	10186002	NELAP	PA
6115 - 7,12-Dimethylbenz(a) anthracene	EPA 8270D	10186002	NELAP	PA
5500 - Acenaphthene	EPA 8270D	10186002	NELAP	PA
5505 - Acenaphthylene	EPA 8270D	10186002	NELAP	PA
5510 - Acetophenone	EPA 8270D	10186002	NELAP	PA
4330 - Acrylamide	EPA 8270D	10186002	NELAP	PA
5545 - Aniline	EPA 8270D	10186002	NELAP	PA
5555 - Anthracene	EPA 8270D	10186002	NELAP	PA
5560 - Aramite	EPA 8270D	10186002	NELAP	PA
7065 - Atrazine	EPA 8270D	10186002	NELAP	PA
5570 - Benzaldehyde	EPA 8270D	10186002	NELAP	PA
5567 - Benzenethiol	EPA 8270D	10186002	NELAP	PA
5595 - Benzidine	EPA 8270D	10186002	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270D	10186002	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270D	10186002	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270D	10186002	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270D	10186002	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270D	10186002	NELAP	PA
5610 - Benzoic acid	EPA 8270D	10186002	NELAP	PA
5630 - Benzyl alcohol	EPA 8270D	10186002	NELAP	PA
5670 - Butyl benzyl phthalate	EPA 8270D	10186002	NELAP	PA
7180 - Caprolactam	EPA 8270D	10186002	NELAP	PA
5680 - Carbazole	EPA 8270D	10186002	NELAP	PA
7260 - Chlorobenzilate	EPA 8270D	10186002	NELAP	PA
5855 - Chrysene	EPA 8270D	10186002	NELAP	PA
6065 - Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	EPA 8270D	10186002	NELAP	PA
5925 - Di-n-butyl phthalate	EPA 8270D	10186002	NELAP	PA
6200 - Di-n-octyl phthalate	EPA 8270D	10186002	NELAP	PA
7405 - Diallate	EPA 8270D	10186002	NELAP	PA
9354 - Dibenz(a, h) acridine	EPA 8270D	10186002	NELAP	PA
5900 - Dibenz(a, j) acridine	EPA 8270D	10186002	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270D	10186002	NELAP	PA
5905 - Dibenzofuran	EPA 8270D	10186002	NELAP	PA
6070 - Diethyl phthalate	EPA 8270D	10186002	NELAP	PA
7475 - Dimethoate	EPA 8270D	10186002	NELAP	PA
6135 - Dimethyl phthalate	EPA 8270D	10186002	NELAP	PA
8620 - Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8270D	10186002	NELAP	PA
6205 - Diphenylamine	EPA 8270D	10186002	NELAP	PA
8625 - Disulfoton	EPA 8270D	10186002	NELAP	PA
6260 - Ethyl methanesulfonate	EPA 8270D	10186002	NELAP	PA
7580 - Famphur	EPA 8270D	10186002	NELAP	PA
6265 - Fluoranthene	EPA 8270D	10186002	NELAP	PA
6270 - Fluorene	EPA 8270D	10186002	NELAP	PA
6275 - Hexachlorobenzene	EPA 8270D	10186002	NELAP	PA
4835 - Hexachlorobutadiene	EPA 8270D	10186002	NELAP	PA
6285 - Hexachlorocyclopentadiene	EPA 8270D	10186002	NELAP	PA
4840 - Hexachloroethane	EPA 8270D	10186002	NELAP	PA
6295 - Hexachloropropene	EPA 8270D	10186002	NELAP	PA
6312 - Indene	EPA 8270D	10186002	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270D	10186002	NELAP	PA
6320 - Isophorone	EPA 8270D	10186002	NELAP	PA
6325 - Isosafrole	EPA 8270D	10186002	NELAP	PA
6345 - Methapyrilene	EPA 8270D	10186002	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
6375 - Methyl methanesulfonate	EPA 8270D	10186002	NELAP	PA
7825 - Methyl parathion (Parathion, methyl)	EPA 8270D	10186002	NELAP	PA
5005 - Naphthalene	EPA 8270D	10186002	NELAP	PA
5015 - Nitrobenzene	EPA 8270D	10186002	NELAP	PA
7955 - Parathion, ethyl	EPA 8270D	10186002	NELAP	PA
6590 - Pentachlorobenzene	EPA 8270D	10186002	NELAP	PA
6600 - Pentachloronitrobenzene	EPA 8270D	10186002	NELAP	PA
6605 - Pentachlorophenol	EPA 8270D	10186002	NELAP	PA
6610 - Phenacetin	EPA 8270D	10186002	NELAP	PA
6615 - Phenanthrene	EPA 8270D	10186002	NELAP	PA
6625 - Phenol	EPA 8270D	10186002	NELAP	PA
7985 - Phorate	EPA 8270D	10186002	NELAP	PA
6640 - Phthalic anhydride	EPA 8270D	10186002	NELAP	PA
6650 - Pronamide (Kerb)	EPA 8270D	10186002	NELAP	PA
6665 - Pyrene	EPA 8270D	10186002	NELAP	PA
5095 - Pyridine	EPA 8270D	10186002	NELAP	PA
6670 - Quinoline	EPA 8270D	10186002	NELAP	PA
6685 - Safrole	EPA 8270D	10186002	NELAP	PA
8235 - Thionazin (Zinophos)	EPA 8270D	10186002	NELAP	PA
6750 - Thiophenol (Benzenethiol)	EPA 8270D	10186002	NELAP	PA
6125 - a-a-Dimethylphenethylamine	EPA 8270D	10186002	NELAP	PA
5760 - bis(2-Chloroethoxy)methane	EPA 8270D	10186002	NELAP	PA
5765 - bis(2-Chloroethyl) ether	EPA 8270D	10186002	NELAP	PA
5780 - bis(2-Chloroisopropyl) ether	EPA 8270D	10186002	NELAP	PA
6062 - bis(2-Ethylhexyl)adipate	EPA 8270D	10186002	NELAP	PA
5025 - n-Nitroso-di-n-butylamine	EPA 8270D	10186002	NELAP	PA
6545 - n-Nitrosodi-n-propylamine	EPA 8270D	10186002	NELAP	PA
6525 - n-Nitrosodiethylamine	EPA 8270D	10186002	NELAP	PA
6530 - n-Nitrosodimethylamine	EPA 8270D	10186002	NELAP	PA
6535 - n-Nitrosodiphenylamine	EPA 8270D	10186002	NELAP	PA
6550 - n-Nitrosomethylethylamine	EPA 8270D	10186002	NELAP	PA
6555 - n-Nitrosomorpholine	EPA 8270D	10186002	NELAP	PA
6560 - n-Nitrosopiperidine	EPA 8270D	10186002	NELAP	PA
6565 - n-Nitrosopyrrolidine	EPA 8270D	10186002	NELAP	PA
8290 - o,o,o-Triethyl phosphorothioate	EPA 8270D	10186002	NELAP	PA
8310 - tris-(2,3-Dibromopropyl) phosphate (tris-BP)	EPA 8270D	10186002	NELAP	PA
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 8290	10187209	NELAP	PA
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 8290	10187209	NELAP	PA
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	EPA 8290	10187209	NELAP	PA
9420 - 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	EPA 8290	10187209	NELAP	PA
9423 - 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	EPA 8290	10187209	NELAP	PA
9453 - 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	EPA 8290	10187209	NELAP	PA
9471 - 1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	EPA 8290	10187209	NELAP	PA
9456 - 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	EPA 8290	10187209	NELAP	PA
9474 - 1,2,3,6,7,8-Hexachlorodibenzofuran	EPA 8290	10187209	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
(1,2,3,6,7,8-Hxcdf)				
9459 - 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	EPA 8290	10187209	NELAP	PA
9477 - 1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	EPA 8290	10187209	NELAP	PA
9540 - 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	EPA 8290	10187209	NELAP	PA
9543 - 1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	EPA 8290	10187209	NELAP	PA
9480 - 2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290	10187209	NELAP	PA
9549 - 2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290	10187209	NELAP	PA
9618 - 2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	EPA 8290	10187209	NELAP	PA
9612 - 2,3,7,8-Tetrachlorodibenzofuran	EPA 8290	10187209	NELAP	PA
9438 - Total Hpcdd	EPA 8290	10187209	NELAP	PA
9444 - Total Hpcdf	EPA 8290	10187209	NELAP	PA
9468 - Total Hxcdd	EPA 8290	10187209	NELAP	PA
9483 - Total Hxcdf	EPA 8290	10187209	NELAP	PA
9555 - Total Pecdd	EPA 8290	10187209	NELAP	PA
9552 - Total Pecdf	EPA 8290	10187209	NELAP	PA
9609 - Total TCDD	EPA 8290	10187209	NELAP	PA
9615 - Total TCDF	EPA 8290	10187209	NELAP	PA
9519 - 1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	EPA 8290A	10187403	NELAP	PA
9516 - 1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	EPA 8290A	10187403	NELAP	PA
9426 - 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	EPA 8290A	10187403	NELAP	PA
9420 - 1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	EPA 8290A	10187403	NELAP	PA
9423 - 1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	EPA 8290A	10187403	NELAP	PA
9453 - 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	EPA 8290A	10187403	NELAP	PA
9471 - 1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	EPA 8290A	10187403	NELAP	PA
9456 - 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	EPA 8290A	10187403	NELAP	PA
9474 - 1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	EPA 8290A	10187403	NELAP	PA
9459 - 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	EPA 8290A	10187403	NELAP	PA
9477 - 1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	EPA 8290A	10187403	NELAP	PA
9540 - 1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	EPA 8290A	10187403	NELAP	PA
9543 - 1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	EPA 8290A	10187403	NELAP	PA
9480 - 2,3,4,6,7,8-Hexachlorodibenzofuran	EPA 8290A	10187403	NELAP	PA
9549 - 2,3,4,7,8-Pentachlorodibenzofuran	EPA 8290A	10187403	NELAP	PA
9618 - 2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	EPA 8290A	10187403	NELAP	PA
9612 - 2,3,7,8-Tetrachlorodibenzofuran	EPA 8290A	10187403	NELAP	PA
9438 - Total Hpcdd	EPA 8290A	10187403	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
9444 - Total Hpcdf	EPA 8290A	10187403	NELAP	PA
9468 - Total Hxcdd	EPA 8290A	10187403	NELAP	PA
9483 - Total Hxcdf	EPA 8290A	10187403	NELAP	PA
9555 - Total Pecdd	EPA 8290A	10187403	NELAP	PA
9552 - Total Pecdf	EPA 8290A	10187403	NELAP	PA
9609 - Total TCDD	EPA 8290A	10187403	NELAP	PA
9615 - Total TCDF	EPA 8290A	10187403	NELAP	PA
6110 - 2,5-Dimethylbenzaldehyde	EPA 8315	10187801	NELAP	PA
4300 - Acetaldehyde	EPA 8315	10187801	NELAP	PA
4325 - Acrolein (Propenal)	EPA 8315	10187801	NELAP	PA
5570 - Benzaldehyde	EPA 8315	10187801	NELAP	PA
4430 - Butylaldehyde (Butanal)	EPA 8315	10187801	NELAP	PA
4545 - Crotonaldehyde	EPA 8315	10187801	NELAP	PA
4815 - Formaldehyde	EPA 8315	10187801	NELAP	PA
3825 - Hexanaldehyde (Hexanal)	EPA 8315	10187801	NELAP	PA
6330 - Isovaleraldehyde	EPA 8315	10187801	NELAP	PA
3965 - Propionaldehyde (Propanal)	EPA 8315	10187801	NELAP	PA
6755 - Tolualdehyde (1,2-Tolualdehyde)	EPA 8315	10187801	NELAP	PA
5125 - m-Tolualdehyde (1,3-Tolualdehyde)	EPA 8315	10187801	NELAP	PA
6760 - p-Tolualdehyde (1,4-Tolualdehyde)	EPA 8315	10187801	NELAP	PA
7710 - 3-Hydroxycarbofuran	EPA 8318	10188406	NELAP	PA
7010 - Aldicarb (Temik)	EPA 8318	10188406	NELAP	PA
7015 - Aldicarb sulfone	EPA 8318	10188406	NELAP	PA
7195 - Carbaryl (Sevin)	EPA 8318	10188406	NELAP	PA
7205 - Carbofuran (Furaden)	EPA 8318	10188406	NELAP	PA
7800 - Methiocarb (Mesurol)	EPA 8318	10188406	NELAP	PA
7805 - Methomyl (Lannate)	EPA 8318	10188406	NELAP	PA
8080 - Propoxur (Baygon)	EPA 8318	10188406	NELAP	PA
7710 - 3-Hydroxycarbofuran	EPA 8318A	10188600	NELAP	PA
7010 - Aldicarb (Temik)	EPA 8318A	10188600	NELAP	PA
7015 - Aldicarb sulfone	EPA 8318A	10188600	NELAP	PA
7195 - Carbaryl (Sevin)	EPA 8318A	10188600	NELAP	PA
7205 - Carbofuran (Furaden)	EPA 8318A	10188600	NELAP	PA
7800 - Methiocarb (Mesurol)	EPA 8318A	10188600	NELAP	PA
7805 - Methomyl (Lannate)	EPA 8318A	10188600	NELAP	PA
8080 - Propoxur (Baygon)	EPA 8318A	10188600	NELAP	PA
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330	10189807	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8330	10189807	NELAP	PA
9651 - 2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330	10189807	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8330	10189807	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8330	10189807	NELAP	PA
9303 - 2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330	10189807	NELAP	PA
9507 - 2-Nitrotoluene	EPA 8330	10189807	NELAP	PA
9510 - 3-Nitrotoluene	EPA 8330	10189807	NELAP	PA
9306 - 4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330	10189807	NELAP	PA
9513 - 4-Nitrotoluene	EPA 8330	10189807	NELAP	PA
6415 - Methyl-2,4,6-trinitrophenylnitramine (tetryl)	EPA 8330	10189807	NELAP	PA
5015 - Nitrobenzene	EPA 8330	10189807	NELAP	PA
9522 - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330	10189807	NELAP	PA
9558 - Pentaerythritoltetranitrate	EPA 8330	10189807	NELAP	PA
9432 - RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330	10189807	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
6885 - 1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330A	10190008	NELAP	PA
6160 - 1,3-Dinitrobenzene (1,3-DNB)	EPA 8330A	10190008	NELAP	PA
9651 - 2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330A	10190008	NELAP	PA
6185 - 2,4-Dinitrotoluene (2,4-DNT)	EPA 8330A	10190008	NELAP	PA
6190 - 2,6-Dinitrotoluene (2,6-DNT)	EPA 8330A	10190008	NELAP	PA
9303 - 2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330A	10190008	NELAP	PA
9507 - 2-Nitrotoluene	EPA 8330A	10190008	NELAP	PA
9510 - 3-Nitrotoluene	EPA 8330A	10190008	NELAP	PA
9306 - 4-Amino-2,6-dimitrotoluene (4-am-dnt)	EPA 8330A	10190008	NELAP	PA
9513 - 4-Nitrotoluene	EPA 8330A	10190008	NELAP	PA
6415 - Methyl-2,4,6-trinitrophenylnitramine (tetryl)	EPA 8330A	10190008	NELAP	PA
5015 - Nitrobenzene	EPA 8330A	10190008	NELAP	PA
9522 - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330A	10190008	NELAP	PA
9558 - Pentaerythritoltetranitrate	EPA 8330A	10190008	NELAP	PA
9432 - RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330A	10190008	NELAP	PA
1645 - Total Cyanide	EPA 9012A	10193405	NELAP	PA
1615 - Corrosivity	EPA 9045C	10198400	NELAP	PA
1900 - pH	EPA 9045C	10198400	NELAP	PA
1610 - Conductivity	EPA 9050	10198604	NELAP	PA
1610 - Conductivity	EPA 9050A	10198808	NELAP	PA
1905 - Total Phenolics	EPA 9066	10200609	NELAP	PA
1860 - Oil & Grease	EPA 9071B	10201602	NELAP	PA
1560 - Cation exchange capacity	EPA 9081	10203404	NELAP	PA
1780 - Ignitability	EPA 1010A	10234807	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270C SIM	10242407	NELAP	PA
5500 - Acenaphthene	EPA 8270C SIM	10242407	NELAP	PA
5505 - Acenaphthylene	EPA 8270C SIM	10242407	NELAP	PA
5555 - Anthracene	EPA 8270C SIM	10242407	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270C SIM	10242407	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270C SIM	10242407	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270C SIM	10242407	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270C SIM	10242407	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270C SIM	10242407	NELAP	PA
5855 - Chrysene	EPA 8270C SIM	10242407	NELAP	PA
5895 - Dibenz(a,h) anthracene	EPA 8270C SIM	10242407	NELAP	PA
6265 - Fluoranthene	EPA 8270C SIM	10242407	NELAP	PA
6270 - Fluorene	EPA 8270C SIM	10242407	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270C SIM	10242407	NELAP	PA
5005 - Naphthalene	EPA 8270C SIM	10242407	NELAP	PA
6615 - Phenanthrene	EPA 8270C SIM	10242407	NELAP	PA
6665 - Pyrene	EPA 8270C SIM	10242407	NELAP	PA
6380 - 1-Methylnaphthalene	EPA 8270D SIM	10242509	NELAP	PA
5500 - Acenaphthene	EPA 8270D SIM	10242509	NELAP	PA
5505 - Acenaphthylene	EPA 8270D SIM	10242509	NELAP	PA
5555 - Anthracene	EPA 8270D SIM	10242509	NELAP	PA
5575 - Benzo(a)anthracene	EPA 8270D SIM	10242509	NELAP	PA
5580 - Benzo(a)pyrene	EPA 8270D SIM	10242509	NELAP	PA
5585 - Benzo(b)fluoranthene	EPA 8270D SIM	10242509	NELAP	PA
5590 - Benzo(g,h,i)perylene	EPA 8270D SIM	10242509	NELAP	PA
5600 - Benzo(k)fluoranthene	EPA 8270D SIM	10242509	NELAP	PA
5855 - Chrysene	EPA 8270D SIM	10242509	NELAP	PA

Solid Chemical Materials

Analyte	Method Name	Method Code	Type	AB
5895 - Dibenz(a,h) anthracene	EPA 8270D SIM	10242509	NELAP	PA
6265 - Fluoranthene	EPA 8270D SIM	10242509	NELAP	PA
6270 - Fluorene	EPA 8270D SIM	10242509	NELAP	PA
6315 - Indeno(1,2,3-cd) pyrene	EPA 8270D SIM	10242509	NELAP	PA
5005 - Naphthalene	EPA 8270D SIM	10242509	NELAP	PA
6615 - Phenanthrene	EPA 8270D SIM	10242509	NELAP	PA
6665 - Pyrene	EPA 8270D SIM	10242509	NELAP	PA
1900 - pH	EPA 9040C	10244403	NELAP	PA
4870 - Iodomethane (Methyl iodide)	EPA 8260C	10307003	NELAP	PA
1950 - Residue-total	SM 2540 G, 21st Ed	20006206	NELAP	PA
6218 - EPH Aliphatic C19-C36	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6222 - EPH Aliphatic C9-C18	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6232 - EPH Aromatic C11-C22	MADEP EPH, Rev.1.1	90017202	NELAP	PA
6234 - EPH Aromatic C11-C22 Unadjusted	MADEP EPH, Rev.1.1	90017202	NELAP	PA
5304 - VPH Aliphatic C5-C8	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5305 - VPH Aliphatic C5-C8 Unadjusted	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5306 - VPH Aliphatic C9-C12	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5307 - VPH Aliphatic C9-C12 Unadjusted	MADEP VPH, Rev.1.1	90017406	NELAP	PA
5311 - VPH Aromatic C9-C10	MADEP VPH, Rev.1.1	90017406	NELAP	PA
9369 - Diesel range organics (DRO)	TNRCC 1005, Rev.3	90019208	NELAP	PA
2050 - Total Petroleum Hydrocarbons (TPH)	TNRCC 1005, Rev.3	90019208	NELAP	PA

Biological Tissue

Analyte	Method Name	Method Code	Type	AB
1000 - Aluminum	EPA 6010	10155201	NELAP	LA
1005 - Antimony	EPA 6010	10155201	NELAP	LA
1010 - Arsenic	EPA 6010	10155201	NELAP	LA
1015 - Barium	EPA 6010	10155201	NELAP	LA
1020 - Beryllium	EPA 6010	10155201	NELAP	LA
1025 - Boron	EPA 6010	10155201	NELAP	LA
1030 - Cadmium	EPA 6010	10155201	NELAP	LA
1035 - Calcium	EPA 6010	10155201	NELAP	LA
1040 - Chromium	EPA 6010	10155201	NELAP	LA
1050 - Cobalt	EPA 6010	10155201	NELAP	LA
1055 - Copper	EPA 6010	10155201	NELAP	LA
1070 - Iron	EPA 6010	10155201	NELAP	LA
1075 - Lead	EPA 6010	10155201	NELAP	LA
1085 - Magnesium	EPA 6010	10155201	NELAP	LA
1090 - Manganese	EPA 6010	10155201	NELAP	LA
1100 - Molybdenum	EPA 6010	10155201	NELAP	LA
1105 - Nickel	EPA 6010	10155201	NELAP	LA
1125 - Potassium	EPA 6010	10155201	NELAP	LA
1140 - Selenium	EPA 6010	10155201	NELAP	LA
1150 - Silver	EPA 6010	10155201	NELAP	LA
1155 - Sodium	EPA 6010	10155201	NELAP	LA
1160 - Strontium	EPA 6010	10155201	NELAP	LA
1165 - Thallium	EPA 6010	10155201	NELAP	LA
1175 - Tin	EPA 6010	10155201	NELAP	LA
1180 - Titanium	EPA 6010	10155201	NELAP	LA
1185 - Vanadium	EPA 6010	10155201	NELAP	LA
1190 - Zinc	EPA 6010	10155201	NELAP	LA
1005 - Antimony	EPA 6020	10156000	NELAP	LA
1010 - Arsenic	EPA 6020	10156000	NELAP	LA

Biological Tissue

Analyte	Method Name	Method Code	Type	AB
1020 - Beryllium	EPA 6020	10156000	NELAP	LA
1030 - Cadmium	EPA 6020	10156000	NELAP	LA
1040 - Chromium	EPA 6020	10156000	NELAP	LA
1055 - Copper	EPA 6020	10156000	NELAP	LA
1075 - Lead	EPA 6020	10156000	NELAP	LA
1105 - Nickel	EPA 6020	10156000	NELAP	LA
1140 - Selenium	EPA 6020	10156000	NELAP	LA
1165 - Thallium	EPA 6020	10156000	NELAP	LA
1095 - Mercury	EPA 7471	10166004	NELAP	LA
7355 - 4,4'-DDD	EPA 8081	10178402	NELAP	LA
7360 - 4,4'-DDE	EPA 8081	10178402	NELAP	LA
7365 - 4,4'-DDT	EPA 8081	10178402	NELAP	LA
7025 - Aldrin	EPA 8081	10178402	NELAP	LA
7250 - Chlordane (tech.)	EPA 8081	10178402	NELAP	LA
7470 - Dieldrin	EPA 8081	10178402	NELAP	LA
7685 - Heptachlor	EPA 8081	10178402	NELAP	LA
7690 - Heptachlor epoxide	EPA 8081	10178402	NELAP	LA
8250 - Toxaphene (Chlorinated camphene)	EPA 8081	10178402	NELAP	LA
7110 - alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	10178402	NELAP	LA
7115 - beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	10178402	NELAP	LA
7105 - delta-BHC	EPA 8081	10178402	NELAP	LA
7120 - gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	EPA 8081	10178402	NELAP	LA
8880 - Aroclor-1016 (PCB-1016)	EPA 8082	10179007	NELAP	LA
8885 - Aroclor-1221 (PCB-1221)	EPA 8082	10179007	NELAP	LA
8890 - Aroclor-1232 (PCB-1232)	EPA 8082	10179007	NELAP	LA
8895 - Aroclor-1242 (PCB-1242)	EPA 8082	10179007	NELAP	LA
8900 - Aroclor-1248 (PCB-1248)	EPA 8082	10179007	NELAP	LA
8905 - Aroclor-1254 (PCB-1254)	EPA 8082	10179007	NELAP	LA
8910 - Aroclor-1260 (PCB-1260)	EPA 8082	10179007	NELAP	LA
6715 - 1,2,4,5-Tetrachlorobenzene	EPA 8270	10185203	NELAP	LA
6400 - 2-Methylphenol (o-Cresol)	EPA 8270	10185203	NELAP	LA
6405 - 3-Methylphenol (m-Cresol)	EPA 8270	10185203	NELAP	LA
6410 - 4-Methylphenol (p-Cresol)	EPA 8270	10185203	NELAP	LA
5855 - Chrysene	EPA 8270	10185203	NELAP	LA
6275 - Hexachlorobenzene	EPA 8270	10185203	NELAP	LA
4835 - Hexachlorobutadiene	EPA 8270	10185203	NELAP	LA
6285 - Hexachlorocyclopentadiene	EPA 8270	10185203	NELAP	LA
4840 - Hexachloroethane	EPA 8270	10185203	NELAP	LA
6290 - Hexachlorophene	EPA 8270	10185203	NELAP	LA
6590 - Pentachlorobenzene	EPA 8270	10185203	NELAP	LA
6605 - Pentachlorophenol	EPA 8270	10185203	NELAP	LA
5095 - Pyridine	EPA 8270	10185203	NELAP	LA
5025 - n-Nitroso-di-n-butylamine	EPA 8270	10185203	NELAP	LA
6525 - n-Nitrosodiethylamine	EPA 8270	10185203	NELAP	LA

Clients and Customers are urged to verify the laboratory's current certification status with the Louisiana Environmental Laboratory Accreditation Program.

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Details on method quality control (QC) processes are provided in the individual Analytical Procedures. QC limits are maintained in the LIMS. This appendix provides an overview for representative methodology.
NOTE: This appendix is not applicable to OH VAP work. See the OH VAP approved SOPs for QC information.

SW - 846 Quality Control GC/MS Volatiles Method 8260		
Type	**Frequency**	**Corrective Action**
Surrogates: Toluene-d_8 Bromofluorobenzene 1,2-Dichloroethane-d_4 Dibromofluoromethane	Each sample, MS, MSD, LCS, and blank	Reanalyze sample if outside limits; if reanalysis confirms original, document on report and/or case narrative
Matrix Spikes: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Evaluation in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Samples: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Reanalyze LCS and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits. Compounds that fail high in the LCS and are ND in the samples, can be reported.
Matrix Spike Duplicates (RPD): Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	Once for each 12-hour time period or ≤20 samples	Reanalyze blank and associated samples if blank outside limits
Internal Standards (ISTD): Fluorobenzene Chlorobenzene-d_5 1,4-Dichlorobenzene-d_4 tert-Butyl alcohol-d10	Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

SW - 846
Quality Control
GC/MS Semivolatiles Method 8270

Type	Frequency	Corrective Action
Surrogate: Nitrobenzene-d_5 2-Fluorobiphenyl Terphenyl-d_{14} Phenol-d_6 2-Fluorophenol 2,4,6-Tribromophenol	Each sample, MS, MSD, LCS, and blank	Repeat extraction and analysis; if reanalysis confirms original, document on report and/or case narrative
Matrix Spikes: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Evaluation in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds that fail high in the LCS and are ND in the samples, can be reported.
Matrix Spike Duplicates (RPD): Same as for matrix spikes	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	Once per extraction group (≤20) of samples, each matrix, level	Re-extract and reanalyze blank and associated samples
Internal Standards (ISTD): 1,4-Dichlorobenzene-d_4 Naphthalene-d_8 Acenaphthene-d_{10} Phenanthrene-d_{10} Chrysene-d_{12} Perylene-d_{12}	Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

SW - 846 Quality Control GC/MS Semivolatiles Method 8270 SIM		
Type	**Frequency**	**Corrective Action**
Surrogate: **1-Methylnaphthalene-d10** **Fluoranthene-d10** **Benzo(a)pyrene-d12**	Each sample, MS, MSD, LCS, and blank	Repeat extraction and analysis; if reanalysis confirms original, document on report and/or case narrative
Matrix Spikes: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Evaluation in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds that fail high in the LCS and are ND in the samples, can be reported.
Matrix Spike Duplicates (RPD): Same as for matrix spikes	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	Once per extraction group (≤20) of samples, each matrix, level	Re-extract and reanalyze blank and associated samples
Internal Standards (ISTD): 1,4-Dichlorobenzene-d_4 Naphthalene-d_8 Acenaphthene-d_{10} Phenanthrene-d_{10} Chrysene-d_{12} Perylene-d_{12}	Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

SW - 846 Quality Control Dioxins/Furans Method 8290		
Type	**Frequency**	**Corrective Action**
Labeled Compounds: 13C Labeled Isotope of each of 17 Toxic PCDD/PCDF	Each sample, OPR, and blank	Repeat extraction and analysis; if reanalysis confirms original, document on report and/or case narrative
Ongoing Precision and Recovery Standard (OPR): Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Reanalyze OPR and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits. Compounds that fail high in the OPR and are ND in the samples, can be reported.
Blanks:	Once for each 12-hour time period or ≤20 samples	Reanalyze blank and associated samples if blank outside limits
Internal Standards (ISTD): 13C12-1234-TCDD 13C12-123468-HxCDD	Each sample, OPR, and blank	RT ± 15 secs of retention time in initial calibration.

Quality Control Dioxins/Furans Method 1613B		
Type	**Frequency**	**Corrective Action**
Labeled Compounds: 13C Labeled Isotope of each of 17 Toxic PCDD/PCDF	Each sample, OPR, and blank	Repeat extraction and analysis; if reanalysis confirms original, document on report and/or case narrative
Ongoing Precision and Recovery Standard (OPR): Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Reanalyze OPR and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits. Compounds that fail high in the OPR and are ND in the samples, can be reported.
Blanks:	Once for each 12-hour time period or ≤20 samples	Reanalyze blank and associated samples if blank outside limits
Internal Standards (ISTD): 13C12-1234-TCDD 13C12-123468-HxCDD	Each sample, OPR, and blank	RT ± 15 secs of retention time in initial calibration.

Quality Control
Congeners Method 1668

Type	Frequency	Corrective Action
Labeled Compounds: 13C Labeled Isotope of each of 18 Toxic PCBs	Each sample, OPR, and blank	Repeat extraction and analysis; if reanalysis confirms original, document on report and/or case narrative
Ongoing Precision and Recovery Standard (OPR): Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Reanalyze OPR and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits. Compounds that fail high in the OPR and are ND in the samples, can be reported.
Blanks:	Once for each 12-hour time period or ≤20 samples	Reanalyze blank and associated samples if blank outside limits
Internal Standards (ISTD): 13C12-PCB70 13C12-PCB111 13C12-PCB141 13C12-PCB170	Each sample, OPR, and blank	RT ± 15 secs of retention time in initial calibration.

SW-846
Quality Control
Pesticides/PCBs Methods 8081; 8082; 8141; 8151

Type	Frequency	Corrective Action
Surrogate: Organochlorine Pesticides & PCBs Decachlorobiphenyl (DCB) Tetrachloro-*m*-xylene (TCMX) Herbicides: Dichloroacetic acid (DCAA) Organophosphorous Pesticides: 2-nitro-*m*-xylene (2NMX)	Added to each sample, MS/MSD, blank, LCS/LCSD during the extraction phase	Repeat extraction and analysis. If reanalysis confirms original result, report results and comment in case narrative
Matrix Spikes: Organochlorine Pesticides: Spike all compounds of interest, except PCBs, chlordane, and toxaphene Herbicides & Organophosphorous Pesticides: all compounds of interest PCBs: Aroclor 1016 & Aroclor 1260	Each extraction group (≤20) of samples per matrix/level	Evaluation in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample: Organochlorine Pesticides: Spike all compounds of interest, except PCBs, chlordane, and toxaphene Herbicides & Organophosphorous Pesticides: all compounds of interest PCBs: Aroclor 1016 & Aroclor 1260	Each group (≤20) when MS/MSD falls outside established limits	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds that fail high in the LCS and are ND in the samples can be reported.

SW-846 Quality Control Pesticides/PCBs Methods 8081; 8082; 8141; 8151 (continued)		
Type	**Frequency**	**Corrective Action**
Matrix Spike Duplicates (RPD): Organochlorine Pesticides: Spike all compounds of interest, except PCBs, chlordane, and toxaphene Herbicides & Organophosphorous Pesticides: all compounds of interest PCBs: Aroclor 1016 & Aroclor 1260	Each extraction group (≤20) of samples per matrix/level	Evaluated in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Blanks:	Once per extraction group (≤20) of samples, each matrix, level	Inject a hexane or solvent blank first to be sure the analytical system is clean then reinject the blank itself. If the reinjected blank is acceptable, any samples extracted with this blank should be reinjected if they, too, contain the analyte which was contaminating the blank. If the reinjected blank is unacceptable, any affected samples must be reextracted.
Internal Standards (ISTD): Herbicides: 4,4'-dibromo octafluorobiphenyl (DBOB)	Each sample, MS, MSD, LCS, and blank	Internal standard criteria is advisory only.

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

SW-846
Quality Control
Volatiles by GC
8021

Type	Frequency	Corrective Action
Surrogates: Aromatics; α,α,α-Trifluorotoluene (TFT)	Each sample, MS, MSD, LCS and blank	Reanalyze if the surrogate recovery is outside the limits unless matrix-related problems are evident.
Matrix Spikes: Spike all compounds of interest	Each group of samples (≤20) of similar matrix/level each method	Evaluation in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20); LCSD is analyzed if sufficient volume is not available for MS/MSD	Reanalyze LCS and associated samples for compounds outside of acceptance limits. Compounds that fail high in the LCS and are ND in the samples can be reported.
Internal Standard (ISTD): Aromatics; 1-chloro-3-fluorobenzene	Each sample, LCS , MS, MSD, blank, and standard	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative. In cases where the sample matrix is elevating the ISTD recovery, a dilution and reanalysis may be performed.
Matrix Spike Duplicate (RPD): Same compounds as matrix spikes	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	At least once per batch (≤20 samples) and once per 24 hours	Reanalyze blank and associated samples if blank is outside limits

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

SW-846
Quality Control
TPH-DRO
8015B

Type	Frequency	Corrective Action
Surrogate: *o*-Terphenyl	Added to each sample, MS/MSD, blank, LCS/LCSD during the extraction phase	Repeat extraction and analysis. If reanalysis confirms original result, report results and comment in case narrative.
Matrix Spike: # 2 Fuel	Each group (≤20) of samples per matrix/level	Reinject if surrogates appear low. If still out of spec, evaluate for matrix effect. If matrix effect, accept based on LCS data. If no matrix effect, repeat batch.
Laboratory Control Sample: # 2 Fuel	Each group (≤20) of samples per matrix/level	Reinject if surrogates appear low. If still out of spec, reextract batch. LCS that fails high and DRO is ND in the samples can be reported.
Laboratory Control Duplicates (RPD): # 2 Fuel	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	Once per extraction group (≤20) of samples, each matrix, level	Inject a solvent blank first to be sure the analytical system is clean then reinject the blank itself. If the reinjected blank is acceptable, any samples extracted with this blank should be reinjected, if they, too, contain the analyte which was contaminating the blank. If the reinjected blank is unacceptable, any affected samples must be re-extracted.

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

SW-846 Quality Control TPH-GRO 8015B		
Type	**Frequency**	**Corrective Action**
Surrogate: Trifluorotoluene (FID)	Each sample, MS/MSD, LCS, and blank	Reanalyze if the surrogate recovery is outside the limits unless matrix-related problems are evident
Matrix Spike: Gasoline standard	Each group of samples of similar matrix/level (≤20) each method	Evaluation in conjunction with acceptable LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample Gasoline standard	Each group (≤20) of samples. LCSD analyzed if sufficient volume is not available for MS/MSD.	Reanalyze LCS and associated samples. LCS that fails high and GRO is ND in the samples can be reported.
Matrix Spike Duplicate (RPD): Same compounds as matrix spikes	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	At least one per 20 samples and at least once per 24 hours.	Reanalyze blank and associated samples if blank is outside limits

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change

SW-846 Quality Control* Inorganics (Metals)		
Type	**Frequency**	**Corrective Action**
Internal Standard (ICP & ICP/MS only):	Each sample, standard and QC (Unspiked, Dup., MS, MSD, LCS, dilution, post digestion spike and blank)	If the internal standard response falls outside the specified range, then the samples would be reanalyzed.
Matrix Spikes:	Each group of samples of similar matrix/level (≤20) each method	Analyze post-digestion spike sample
Matrix Spike Duplicate (RPD):	Each group of samples of similar matrix/level (20) each method	Analyze post-digestion spike sample if not already run for MS, flag the data
Duplicates (RPD):	Each group of samples of similar matrix/level (≤20) each method	Flag the data

SW-846 Quality Control* Inorganics (Metals)		
Type	**Frequency**	**Corrective Action**
Blanks: Initial Calibration (ICB) Continuing Calibration (CCB)	Each element immediately after calibration verification at 10% frequency or every 2 hours (beginning and end of run min.)	Correct problem, recalibrate, and rerun
Preparation Blank	Each SDG or batch (≤20 samples)	Redigest and reanalyze blank and associated samples if sample result is greater than the LOQ and <20× blank result
Serial Dilutions (ICP, ICP/MS only):	Each group of (≤20) of similar matrix/level	Flag the data
Interference Check Sample (ICP, ICP/MS only):	Each element after Initial Calibration Verification at beginning and end of the run or min. of 2× per 8 hour	Correct for interference, recalibrate the instrument
Laboratory Control Sample:	Each SDG or batch (≤20 samples), each method	Redigest and reanalyze LCS and associated samples. Elements in the LCS that fail high and are ND in the samples can be reported.
Post Digestion Spike:	When matrix spikes are outside 75 % - 125% range, or the statistical window (whichever is tighter).	Flag the data

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

QC Table for SW-846 Miscellaneous Water Tests			
Test	**QC Type**	**Frequency**	**Corrective Action**
Sulfide	Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.
	Laboratory Control Sample	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze. LCSs that fail high (and associated samples are ND) can be reported.
	Duplicate	Each group of samples of similar matrix (≤20)	Ensure that LCS meets acceptance criteria.
	Matrix Spike/ Matrix Spike Duplicate	Each group of samples of similar matrix (≤20)	Ensure that LCS meets acceptance criteria.
	Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.

Bromide (IC) Chloride (IC) Cyanide (total) Fluoride (IC) Nitrate/Nitrite (IC) Sulfate (IC)	Laboratory Control Sample	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze. LCSs that fail high (and associated samples are ND) can be reported.
	Duplicate	Each group of samples of similar matrix (≤10)	Ensure that LCS meets acceptance criteria.
	Matrix Spike	Each group of samples of similar matrix (≤10)	Ensure that LCS meets acceptance criteria.
Phenols TOC Quad	Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.
	Laboratory Control Sample	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze. LCSs that fail high (and associated samples are ND) can be reported.
	Matrix Spike/ Matrix Spike Duplicate	Each group of samples of similar matrix (≤10)	Ensure that LCS meets acceptance criteria.
pH Moisture	Laboratory Control Sample	Each group of samples of similar matrix (≤20)	Re-analyze samples.
	Duplicate	Each group of samples of similar matrix (≤10)	Ensure that LCS meets acceptance criteria.
Microbiology	Organism control	Each lot of media (minimum of one per month)	Investigate cause
	Negative control	Each lot of media (minimum of one per month)	Investigate cause

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

Drinking Water Quality Control Inorganics (Metals)		
Type	**Frequency**	**Corrective Action**
Internal Standard (ICP & ICP/MS only):	Each sample, standard and QC (Unspiked, Dup., MS, LFB, Post Digestion Spike, dilution and blank)	If the internal standard response falls outside the specified range, then the samples would be reanalyzed.
Matrix Spikes:	Each group of samples of similar matrix/level (≤10) each method	Analyze post-digestion spike sample
Duplicates (RPD):	Each group of samples of similar matrix/level (≤10) each method	Flag the data
Blanks: Initial Calibration (ICB) Continuing Calibration (CCB)	Each wavelength immediately after calibration verification at 10% frequency	Correct problem, recalibrate, and rerun
Preparation Blank	Each batch (≤10 samples)	Redigest and reanalyze blank and associated samples if sample result <10 times blank result or >LOQ
Laboratory Fortified Blank (LFB):	Each batch (≤10 samples)	Redigest and reanalyze LFB and associated samples. Elements that fail high in the LFB and are ND in the samples can be reported.
Post Digestion Spike:	When matrix spikes are outside range	Flag the data

Drinking Water EPA Method 525.2 Quality Control		
Type	**Frequency**	**Corrective Action**
Lab Reagent Blank (LRB):	One per extraction batch of (≤20) samples	Re-extract and reanalyze blank and associated samples
Lab Fortified Blank (LFB): Spike all compounds of interest	One per extraction batch of (≤20) samples	Re-extract and reanalyze LFB and associated samples for compounds outside acceptance limits. Compounds that fail high in the LFB and are ND in the samples can be reported.
Matrix Spike/Matrix Spike Duplicate (MS/MSD): Spike all compounds of interest	One per extraction batch of (≤20) samples	Recoveries for LFB must be within criteria. If there is insufficient sample for MSD, then a duplicate (extraction and analysis) of another sample in the batch must be performed.
Surrogates: 1,3-Dimethyl-2-nitrobenzene Perylene-d_{12} Triphenylphosphate	Each sample, LFB, MS, MSD, and blank	Re-extract and reanalyze the sample
Internal Standards (ISTD): Acenaphthene-d_{10} Phenanthrene-d_{10} Chrysene-d_{12}	Each sample, LFB, MS, MSD, and blank	Reanalyze samples

QC Table for Miscellaneous Water Tests

Test	QC Type	Frequency	Corrective Action
Alkalinity Ammonia (ISE) Ammonia (Distill) Dissolved Solids Fluoride (ISE) Hardness Sulfate (TURB) Sulfide Total Solids Turbidity	Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.
	Laboratory Fortified Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.*
	Duplicate	Each group of samples of similar matrix (≤20) Alkalinity, Dissolved Solids, Total Solids, Turbidity each group of similar matrix (≤10)	Ensure that LFB meets acceptance criteria.
	Matrix Spike/ Matrix Spike Duplicate	Each group of samples of similar matrix (≤20) (not for Turbidity)	Ensure that LFB meets acceptance criteria.
Bromide (IC) Chloride (IC) Cyanide (total & free) Fluoride (IC) Nitrogen (TKN) Nitrate/Nitrite Sulfate (IC) Total Phosphorus TOC	Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.
	Laboratory Fortified Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.*
	Duplicate	Each group of samples of similar matrix (≤10)	Ensure that LFB meets acceptance criteria.
	Matrix Spike	Each group of samples of similar matrix (≤10)	Ensure that LFB meets acceptance criteria.
Phenols	Blank	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.
	Laboratory Fortified Blank/Laboratory Control Sample	Each group of samples of similar matrix (≤20)	Prepare the entire batch again and re-analyze.*
	Matrix Spike/ Matrix Spike Duplicate	Each group of samples of similar matrix (≤10)	Ensure that LFB meets acceptance criteria.
pH Moisture	Laboratory Fortified Blank	Each group of samples of similar matrix (≤20)	Re-analyze samples.
	Duplicate	Each group of samples of similar matrix (≤10)	Ensure that LFB meets acceptance criteria.
Microbiology	Organism control (+)	Each lot of media (minimum of one per month)	Investigate cause
	Negative control (-)	Each lot of media (minimum of one per month)	Investigate cause

*LFBs that fail high and associated samples are ND can be reported.

QC Table for Drinking Water Methods: 507, 515.1, 531.1		
Type of QC	**Frequency**	**Corrective Action**
Blank	Each batch of (≤20) samples	Inject a solvent blank to check for analytical system contamination. Re-inject the blank. If the re-injected blank is acceptable then any samples with positive results must be re-injected. If the re-injected blank is unacceptable, all associated samples must be re-extracted.
Surrogate 507 – 2-NMX 515 – DCAA 531 – BDMC	Added to each field and QC sample during the extraction.	Recovery must be within specifications unless matrix-related problems are evident, in which case report results and comment.
Matrix Spike/Matrix Spike Duplicate Spike all compounds of interest, except multipeak compounds	Each batch (≤20) of samples if sample volume is available.	Evaluate in conjunction with the LFB.
Laboratory Fortified Blank (LFB) Spike all compounds of interest, rotate multipeak compounds	Each batch of (≤20) samples. LCSD may be used if insufficient sample for MS/MSD is submitted.	If LFB compounds are outside of acceptance limits, re-extract and re-analyze the batch. Compounds that fail high in the LFB and are ND in the samples can be reported.

QC Table for Drinking Water Method: 524.2		
Type of QC	**Frequency**	**Corrective Action**
Blank	One blank for each 12-hour period or batch of ≤20 samples	Reanalyze blank and associated samples if blank is unacceptable.
Surrogate 4-Bromofluorobenzene 1,2-Dichlorobenzene-d_4	Added to each field and QC sample prior to analysis	Reanalyze sample if outside limits. If reanalysis confirms original, document on report.
Matrix Spike/Matrix Spike Duplicate Spike all compounds of interest	At client request.	Evaluate in conjunction with the LFB.
Laboratory Fortified Blank (LFB) Spike all compounds of interest	One LFB for each 12 hour period.	If target compounds are outside of acceptance limits, re-analyze the LFB. If second LFB fails, recalibrate instrument, re-analyze LFB and any associated samples. Compounds that fail high in the LFB and are ND in the samples can be reported.
Internal standard (ISTD) Fluorobenzene	Added to each field and QC sample prior to analysis	Reanalyze sample if outside limits. If reanalysis confirms original, document on report.

EPA 624
Quality Control
GC/MS Volatiles

Type	Frequency	Corrective Action
Surrogates: 4-Bromofluorobenzene 1,2-Dichloroethane-d_4 Fluorobenzene	Each sample, MS, MSD, LCS, and blank	Reanalyze sample if outside limits; if reanalysis is within limits, the reanalysis data is reported. If surrogates confirm original, document on report and/or case narrative
Matrix Spikes: Spike all compounds of interest	Each batch (≤20) of samples	Evaluated by analyst in conjunction with the LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Samples: Spike all compounds of interest	Each batch (≤20) of samples	Reanalyze LCS and associated samples for compounds outside acceptance limits that are also outside MS/MSD acceptance limits. Compounds that fail high in the LCS and are ND in the samples can be reported.
Matrix Spike Duplicates (RPD): Spike all compounds of interest	Each batch (≤20) of samples	Evaluated by analyst in relationship to other QC results
Blanks:	Once every 24-hour tune period and/or 20 samples, whichever comes first	Reanalyze blank and associated samples if blank outside QC limits
Internal Standards (ISTD): Bromochloromethane 2-Bromo-1-chloropropane 1,4-Difluorobenzene	Each sample, MS, MSD, LCS, and blank	Reanalyze sample if outside limits; if reanalysis is within limits, the reanalysis data is reported. If internals confirm original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

EPA 625
Quality Control
GC/MS Semivolatiles

Type	Frequency	Corrective Action
Surrogate: Nitrobenzene-d_5 2-Fluorobiphenyl Terphenyl-d_{14} Phenol-d_6 2-Fluorophenol 2,4,6-Tribromophenol	Each sample, MS, MSD, LCS, and blank	Re-extract and reanalyze if more than one surrogate out per fraction (acid/base) or any recovery <10%; if re-extraction and reanalysis confirms originals, document on report and/or case narrative
Matrix Spikes: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Evaluate in conjunction with the LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20) of samples per matrix/level	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds that fail high in the LCS and are ND in the samples can be reported.
Matrix Spike Duplicates (RPD): Same as for matrix spikes	Each group (≤20) of samples per matrix/level	Evaluated by analyst in relationship to other QC results
Blanks:	Once per extraction group (≤20) of samples, each matrix, level, instrument	Re-extract and reanalyze blank and associated samples
Internal Standards (ISTD): 1,4-Dichlorobenzene-d_4 2-Fluoronaphthalene Acenaphthene-d_{10} Phenanthrene-d_{10} Chrysene-d_{12} Perylene-d_{12}	Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

EPA 608 Quality Control Pesticides/PCBs		
Type	**Frequency**	**Corrective Action**
Surrogate: Organochlorine Pesticides & PCBs DCB TCMX	Each sample, MS, MSD, LCS, and blank	Repeat extraction and analysis if reanalysis confirms original report results and comment in case narrative
Matrix Spikes: Organochlorine Pesticides: Spike all compounds of interest, except PCBs, chlordane, and toxaphene PCBs: Aroclor 1016 and Aroclor 1260	Each batch (≤20) of samples	Evaluate in conjunction with LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Matrix Spike Duplicates (RPD): Organochlorine Pesticides: Spike all compounds of interest, except PCBs, chlordane, and toxaphene PCBs: Aroclor 1016 and Aroclor 1260	Each batch (≤20) of samples	Evaluated by analyst in relationship to other QC results
Laboratory Control Sample: Organochlorine Pesticides: Spike all compounds of interest, except PCBs, chlordane, and toxaphene PCBs: Aroclor 1016 and Aroclor 1260	Each batch (≤20) of samples	Re-extract and reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds in the LCS that fail high and are ND in the samples can be reported.
Blanks:	Each batch (≤20) of samples	Inject a hexane or solvent blank first to be sure the analytical system is clean then reinject the blank itself. If the reinjected blank is acceptable, any samples extracted with this blank should be reinjected if they, too, contain the analyte which was contaminating the blank. If the reinjected blank is unacceptable, any affected samples must be reextracted.

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

EPA Method 602
Petroleum Analysis
Acceptance Criteria

Type	Frequency	Corrective Action
Surrogate: α,α,α-Trifluorotoluene (PID)	Each sample, MS, MSD, LCS, and blank	Reanalyze if the surrogate recovery is outside the limits unless matrix-related problems are evident.
Matrix Spike: Spike all compounds of interest	Each group (≤20) of samples	Evaluate in conjunction with LCS. Acceptable LCS would be indicative of matrix effects on the MS/MSD.
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20) of samples. LCSD analyzed if sufficient volume is not available for MS/MSD	Reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds in the LCS that fail high and are ND in the samples can be reported.
Matrix Spike Duplicates (RPD): Same compounds as the matrix spike	Each group (≤20) of samples	Evaluated by an analyst in relationship to other QC results
Blanks:	At least once per 24 hours	Reanalyze blank and associated samples if blank is outside limits
Internal Standards (ISTD): 1-Chloro-3-fluorobenzene (PID)	Each sample, MS, MSD, LCS, and blank	Reanalyze samples; if reanalysis confirms original result, document on report or case narrative. In cases where the sample matrix is elevating the ISTD recovery, a dilution and reanalysis may be performed.

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change

EPA Method 600 Series (Method 200.8 for ICP/MS) Quality Control Inorganics (Metals)		
Type	**Frequency**	**Corrective Action**
Internal Standard:	Each sample, standard and QC (Unspiked, Dup., MS, LCS, dilution, Post Digestion Spike and blank)	If the internal standard response falls outside the specified range, then the samples would be reanalyzed.
Matrix Spikes:	Each group of samples of similar matrix/level (≤10) each method	Analyze post-digestion spike sample
Matrix Spike Duplicate (RPD):	Not required	N/A
Duplicates (RPD):	Each group of samples of similar matrix/level (≤10) each method	Flag the data
Blanks: Initial Calibration (ICB) Continuing Calibration (CCB)	Each wavelength immediately after calibration verification at 10% frequency or every 2 hours (beginning and end of run min.)	Correct problem, recalibrate, and rerun
Preparation Blank	Each SDG or batch (≤10 samples)	Redigest and reanalyze blank and associated samples if sample result is greater than the LOQ and <10× blank result
Serial Dilutions:	Each group of (≤10) of similar matrix/level	Flag the data
Interference Check Sample:	Each wavelength after Initial Calibration Verification at beginning and end of the run or min. of 2 times per 8 hour	Correct for interference, recalibrate the instrument
Laboratory Control Sample:	Each SDG or batch (≤10 samples), each method	Redigest and reanalyze LCS and associated samples. Elements in the LCS that fail high and are ND in the samples can be reported.
Post Digestion Spike:	When matrix spikes are outside 70% to 130% range or within the statistical window (whichever is tighter)	Flag the data
Analytical Spike:	One per 10 field samples	ICP-MS – flag the data

Quality Control for Miscellaneous 600 Series Water Tests			
Test	**QC Type**	**Frequency**	**Corrective Action**
Alkalinity **Ammonia (ISE)** **Ammonia (Distill.)** **Dissolved Solids** **Fluoride (ISE)** **Hardness** **Sulfate (turb)** **Sulfide** **Total Solids** **Turbidity**	Blank	Each batch (≤20) of samples	Prepare the entire batch again and re-analyze.
	Laboratory Control Sample	Each batch (≤20) of samples	Prepare the entire batch again and re-analyze.*
	Duplicate	Each batch (≤20) of samples	Ensure that LCS meets acceptance criteria.
	Matrix Spike/ Matrix Spike Duplicate	Each batch (≤20) of samples (not for turbidity)	Ensure that LCS meets acceptance criteria.
Bromide (IC) **Chloride (IC)** **Sulfate (IC)** **Cyanide (total & free)** **Fluoride (IC)** **Nitrogen (TKN)** **Nitrate/Nitrite** **Total Phosphorus** **TOC**	Blank	Each batch (≤20) of samples	Prepare the entire batch again and re-analyze.
	Laboratory Control Sample	Each batch (≤20) of samples	Prepare the entire batch again and re-analyze.*
	Duplicate	Each batch (≤10) of samples	Ensure that LCS meets acceptance criteria.
	Matrix Spike	Each batch (≤10) of samples	Ensure that LCS meets acceptance criteria.
Phenols	Blank	Each batch (≤20) of samples	Prepare the entire batch again and re-analyze.
	Laboratory Control Sample	Each batch (≤20) of samples	Prepare the entire batch again and re-analyze.*
	Matrix Spike/ Matrix Spike Duplicate	Each batch (≤10) of samples	Ensure that LCS meets acceptance criteria.

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

*LCSs that fail high and associated samples are ND can be reported.

TO-15 Volatile Organics in Air		
Type	**Frequency**	**Corrective Action**
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20) of samples	Reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds that fail high in the LCS and are ND in the samples, can be reported.
Blanks:	Once for each 24-hour time period or ≤20 samples	Reanalyze blank and associated samples if blank outside limits
Internal Standards (ISTD): Bromochloromethane 1,4-Difluorobenzene Chlorobenzene-d_5	Each sample, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

TO-14A Volatile Organics in Air		
Type	**Frequency**	**Corrective Action**
Laboratory Control Sample: Spike all compounds of interest	Each group (≤20) of samples	Reanalyze LCS and associated samples for compounds outside acceptance limits. Compounds that fail high in the LCS and are ND in the samples, can be reported.
Blanks:	Once for each 24-hour time period or ≤20 samples	Reanalyze blank and associated samples if blank outside limits
Internal Standards (ISTD): Bromochloromethane 1,4-Difluorobenzene Chlorobenzene-d_5	Each sample, LCS, and blank	Reanalyze samples; if reanalysis confirms original, document on report and/or case narrative

Acceptance limits are based on statistical evaluation of laboratory data and are subject to change.

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MICROBIOLOGICAL TESTING

1. MICROBIOLOGICAL SAMPLE HANDLING

1.1. Microbiological Sample Collection

The containers for environmental microbiology are typically sterile, screw-cap plastic bottles. A minimum of 100 mL of sample is required. The sampling containers are purchased with a sterility certification. The sterility, absence of autofluoresence, and volume of each purchased lot of containers is verified by randomly selecting a container from each purchased lot and inoculating it with approximately 100 mL of sterile tryptic soy broth and placing it in incubation for 24 hours at 35° ± 0.5°C. Each lot of bottles is also checked for absence of autofluoresence with a 366-nm UV light with a 6-Watt bulb. The 100-mL calibration line on the container is verified using a 100-mL Class A graduated cylinder to 2.5% tolerance.

Samples collected for microbiological analyses must follow a specific protocol:

- The sampling taps are to be free of aerators, strainers, hose attachments, and purification devices; they should not be mixing type faucets, and avoid leaky faucets.
- Maintain a steady water flow for 3 to 5 minutes before collecting the sample.
- Using aseptic techniques, fill the container to just above the 100-mL mark on the container. This will allow for mixing and chlorine residual analysis.
- Do not overfill the container.
- If another environmental microbial analysis is required, or if the water is discolored (to act as a color standard), a separate container will be required.

1.2. Microbiological Sample Storage

Because sample integrity can be compromised by improper storage, the environmental microbiology samples are refrigerated with the temperature monitored until requested by the microbiologist for analysis.

Holding times for samples are monitored and analysis is scheduled accordingly. For Safe Drinking Water Act (SDWA) compliance purposes, no sample (for total coliform analysis) with over 30 hours elapsed time from collection will be analyzed. HPC samples from SDWA surface water systems must be tested within 8 hours of collection. Fecal coliform tests on effluents for National Pollutant Discharge Elimination System (NPDES) compliance purposes must be transported to the laboratory within 6 hours of collection. Samples that arrive past 6 hours of when they were collected cannot be tested. Whenever possible, the sample should be tested within 2 hours of receipt.

1.3. Microbiological Sample Return/Disposal

All solid wastes generated from the microbiological analyses are disposed of in bags designated as "BioHazard", sterilized via autoclave and disposed of by incineration. The laboratory uses a sophisticated, laboratory information management system (LIMS), which includes programming to assist in the identification of hazardous wastes at time of discard. In most cases, a sample for coliform testing is collected in a container that will also be the test vessel. When this occurs, samples are discarded in the laboratory immediately after analysis is completed. When samples are not tested in the sample container, the sample containers are returned to sample storage for disposal.

2. MICROBIOLOGICAL TECHNICAL REQUIREMENTS AND TRACEABILITY OF MEASUREMENTS

2.1. Media

- Within the microbiology laboratory, procedures are in place to address preparation, labeling, storage, expiration, documentation, and quality/sterility evaluation requirements for these materials. Only commercially prepared or manufactured dehydrated media is used for SDWA water work. Media may not be formulated from basic ingredients. Each new lot of dehydrated or commercially prepared medium is checked against positive and negative culture controls. Each purchased lot of MMO-MUG media is tested for performance using *E. coli*, *K. pneumoniae*, and *Ps. aeruginosa*, or equivalent organisms following a standard operating procedure. The positive/negative organism check is performed on each new lot of purchased or prepared media for QC purposes.

- Each analytical method includes a list of media needed for the test. These are fully described, including name, purity, and description of preparation. Where applicable, shelf life and storage conditions are also listed.

- The Microbiology Department is responsible for maintaining an inventory of the media needed. New supplies of media are checked by the Purchasing Department to ensure that they match the purchase order. The laboratory is responsible for checking that new supplies meet the method requirements.

- In addition to the name and concentration, the media containers are labeled with the storage conditions, the date opened, and an expiration or re-evaluation date. Subsequent media preparations at the laboratory are fully documented in a logbook and are traceable to, or labeled to include:

    1. Name of media
    2. Concentration, as appropriate
    3. Date prepared
    4. Name of analyst preparing or reference to logbook
    5. Storage conditions
    6. Expiration/re-evaluation date
    7. Manufacturer name and lot #
    8. Sterilization time and temperature
    9. Final pH, where required
    10. Sterility check result

2.2. Microbiological Standard Sources, Calibration, and Preparation

Microbial Control Species - Where required, laboratory cultures are obtained from the American Type Culture Collection (ATCC). Cultures used in testing are no more than five transfers from ATCC freeze-dried cultures.

2.3. Microbiological Equipment Maintenance

Equipment maintenance and calibration is addressed in instrument-specific Operation, Maintenance, and Calibration Procedures (OMC) or instrument-specific instruction manuals located within the department.

The general process for sterilization procedures are outlined below:

2.3.1. All autoclaving is done at 121° ± 1°C, with times as specified below (in minutes):

Carbohydrate media	25
Rinse water	60
Contaminated materials	minimum of 70

2.3.2. Sterile disposable single use membrane filter units or sterile glass filter funnels are used for methods that require filtration.

2.4. Microbiological Labware Cleaning

Sterile disposable plastic ware is primarily used for microbiological analysis. However, procedures are in place to outline the washing process for each type of labware used in the laboratory. Most glassware is machine-washed. Labware that is washed by hand is either air dried or dried in specifically designed ovens and sterilized appropriately. Each new lot, or at least annually, of detergents used to wash glassware for Environmental Microbiology labware, is tested using the Inhibitory Residue Test, as outlined in SM20 9020.B.4.a.2).

MICROBIOLOGICAL INTERNAL QUALITY CONTROL CHECKS

2.5. Microbiological Laboratory Quality Control Samples and Acceptance Criteria

Quality control (QC) samples are analyzed with each batch of samples or new lot of reagents, as required by the referenced methods, to demonstrate that all aspects of the analysis are in control within established limits of precision and accuracy. Chromofluorogenic media QC tests are lot-specific and performed on each newly received lot.

Each laboratory analytical method specifies (or includes cross-references to) the type of QC sample, frequency of analysis, acceptance criteria for QC sample results, and corrective action to be taken if QC sample results fall outside of the acceptance range. The handling of QC data is described in section 9.2 of the Environmental Quality Policy Manual. The types of QC samples and the information each provides are discussed in the following paragraphs.

2.5.1. Negative System Control - The QC on this is method specific and can be found in 1-P-QM-PRO-9018209, Quality Control/Quality Assurance Procedure for Environmental Microbiology.

2.5.2. Positive and Negative Organism Controls - Each lot/batch of media is tested using positive and negative organism controls.

2.5.3. Duplicate Counting (Test Variability/Reproducibility) - duplicate counting is performed monthly on HPC and fecal MF plates. Each analyst who counted samples for a month, counts the plates and their results are evaluated. Counts must be within 10% difference of the total average for all analysts to be acceptable.

2.5.4. Duplicates - For heterotrophic plate count samples, a duplicate is a second aliquot of a sample that is treated identically to the original to determine precision of the test. The plate counts are averaged.

2.5.5. Serial Dilutions - Fecal coliform, biosolids analyses, and heterotrophic plate counts may require serial dilution of the sample.

2.6. Microbiological Quality Control Sample Frequency and Corrective Action

Each analytical method defines the frequency for the required QC samples, where appropriate. The corrective action required when a QC result fails to meet the acceptance criteria is also given, where appropriate.

The QC acceptance criteria are available to analysts in the laboratory. If the results are not within the acceptance criteria, corrective action suitable to the situation must be taken. This may include, but is not limited to, checking calculations, examining other quality control analyzed with the same batch of samples, qualifying results with a comment stating the observed deviation, and invalidating results. It should be noted that resampling may be required in the case of invalidated results for SDWA, Environmental Protection Agency (EPA), Pennsylvania Department of Environmental Protection (PADEP), or Pennsylvania Department of Health (DOH) compliance samples due to the short hold-times in microbiological analysis.

2.7. Microbiological Water Systems

Laboratory Reagent Water Suitability Testing - On an annual basis, a sample is sent to a PADEP certified laboratory for suitability analyses. These serve as confirmation of our analyses, as well as to supply additional data on the water suitability.

2.8. Microbiological Reporting Limits

For microbiological analysis, the limits are method-specified and/or project-specific. This information is programmed into the LIMS for reporting purposes.

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ENVIRONMENTAL

Valid To: November 30, 2016 Certificate Number: 0001.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the laboratory's compliance with ISO IEC 17025:2005, the 2009 NELAC Standard, and the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.0 of the DoD Quality Systems Manual for Environmental Laboratories, accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

Atomic Absorption/ICP-AES Spectrometry, ICP-MS Spectrometry, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, High Performance Liquid Chromatography, Ion Chromatography, Misc.-Electronic Probes (pH, F^-, O_2), Oxygen Demand, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, TCLP, Total Organic Carbon, Turbidity, Liquid Chromatography/Mass Spectrometry/Mass Spectrometry, High Resolution Gas Chromatography/Mass Spectrometry

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Demands					
BOD	---------------	----------	SM 5210B-2001	---------------	----------
CBOD	---------------	----------	SM 5210B-2001	---------------	----------
COD	---------------	----------	EPA 410.4	---------------	----------
Total Carbon	---------------	----------	---------------	SM 5310C-2000	SM 5310B-2000 MOD
Total Inorganic Carbon	---------------	----------	---------------	SM 5310C-2000	SM 5310B-2000 MOD

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Total Organic Carbon	---------------	----------	EPA 415.1 EPA 9060 EPA 9060A SM 5310C-2000	EPA 9060 EPA 9060A SM 5310C- 2000	EPA 9060 EPA 9060A SM 5310B MOD
Nutrients					
Ammonia	---------------	-----------	EPA 350.1 SM 4500 NH3 B & D-1997	---------------	EPA 350.1
Fluoride	---------------	-----------	SM 4500 FC- 1997 EPA 300.0 EPA 340.2 EPA 9056 EPA 9056A	EPA 9056 EPA 9056A	EPA 300.0
Nitrate (as N)	---------------	----------	EPA 300.0 EPA 9056 EPA 9056A	EPA 9056 EPA 9056A	EPA 300.0
Nitrite (as N)	---------------	-----------	EPA 300.0 EPA 9056 EPA 9056A	EPA 9056 EPA 9056A	EPA 300.0
Nitrate/Nitrite	-------------	-----------	EPA 353.2	-------------	----------------
Orthophosphate (as P)	---------------	-----------	EPA 365.3	---------------	-----------
Total Kjeldahl Nitrogen	---------------	-----------	EPA 351.2	---------------	EPA 351.2
Total Phosphorus	---------------	-----------	EPA 365.1	---------------	EPA 365.1
Wet Chemistry					
Acid Volatile Sulfide	---------------	-----------	---------------	---------------	EPA-821-R- 91-100
Acidity	---------------	-----------	SM 2310B-1997	---------------	-----------
Alkalinity	---------------	-----------	SM 2320B-1997	---------------	-----------
Bromide	---------------	-----------	EPA 300.0 EPA 9056 EPA 9056A	EPA 9056 EPA 9056A	-----------
Bulk Density	---------------	-----------	---------------	ASTM E868- 82	ASTM E868- 82
Chloride	---------------	-----------	EPA 300.0 EPA 325.3 EPA 9056 EPA 9056A	EPA 9056 EPA 9056A	EPA 300.0
Color	---------------	-----------	SM 2120B-2001	---------------	----------
Corrosivity	---------------	-----------	---------------	SW-846 Chapter 7	SW-846 Chapter 7

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Cyanide	EPA 9012A EPA 9012B	-----------	EPA 335.2 EPA 335.4 MOD EPA 9012A EPA 9012B ASTM D7511 OIA-1677-09	EPA 9012A EPA 9012B ASTM D7511 OIA-1677-09	EPA 9012A EPA 9012B
Dissolved Oxygen	---------------	-----------	SM 4500 OG-2001	---------------	-----------
Dissolved Silica	---------------	-----------	EPA 370.1 SM 4500 SiC-1997	---------------	-----------
Ferrous Iron	---------------	----------	SM 3500Fe B-MOD 1997	---------------	-----------
Filterable Residue	---------------	----------	SM 2540C-1997	---------------	-----------
Flashpoint	---------------	----------	---------------	EPA1010A	EPA 1010A
Grain Size	---------------	----------	---------------	---------------	ASTM D422
Hardness	---------------	----------	SM 2340C-1997	---------------	-----------
HEM-SGT	---------------	----------	EPA 1664A EPA 1664B	---------------	EPA 9071B
Hexavalent Chromium Digestion	EPA 3060A	----------	---------------	---------------	EPA 3060A
Hexavalent Chromium	EPA 7196A	----------	SM 3500 CrB-2009 EPA 218.6 EPA 7196A EPA 7199	EPA 218.6 EPA 7196A EPA 7199	EPA 7196A EPA 7199
Ignitability	---------------	----------	---------------	40 CFR 261.21	40 CFR 261.21
Non-filterable Residue	---------------	----------	EPA 160.2 SM 2540D-1997	---------------	-----------
Oxidation Reduction Potential	---------------	----------	ASTM D1498	ASTM D1498	ASTM D1498
Paint Filter Test	---------------	----------	EPA 9095A	EPA 9095A	EPA 9095A
pH	---------------	----------	SM 4500 H+B-2000 EPA 150.1 EPA 9040B EPA 9040C	EPA 9040B EPA 9040C EPA 9045C EPA 9045D	EPA 9040B EPA 9040C EPA 9045C EPA 9045D
Phenol	---------------	----------	EPA 420.4 EPA 9066	EPA 9066	-----------
Reactivity	---------------	----------	---------------	SW-846 Chapter 7.3	SW-846 Chapter 7.3
Settleable Residue	---------------	----------	SM 2540F-1997	---------------	-----------
Specific Conductance	---------------	----------	EPA 120.1 SM 2510B-1997 EPA 9050A	EPA 9050A	

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Sulfate	---------------	----------	EPA 300.0 EPA 375.4 EPA 9056 EPA 9056A	EPA 9056 EPA 9056A	EPA 300.0
Sulfide	---------------	----------	EPA 376.1 EPA 376.2 SM 4500 S2D-2000 SM 4500 S2F-2000	---------------	-----------
Surfactants	---------------	----------	SM 5540C-2000	---------------	-----------
Total Filterable Residue	---------------	----------	SM 2540C-1997	---------------	-----------
Total Residue	---------------	----------	EPA 160.3 SM 2540B-1997	---------------	-----------
Total Fixed and Total Volatile Solids, Dissolved Fixed and Dissolved Volatile Solids, Suspended Fixed and Suspended Volatile Solids			SM 2540 E-1997		
Turbidity	---------------	----------	EPA 180.1 SM 2130 B-2001	-----------	-----------
Volatile Residue	---------------	----------	EPA 160.4	-----------	-----------
Metals					
Metals Digestion	EPA 3050B	EPA 3050B	EPA 200.2 EPA 3050B EPA 3005A EPA 3010A EPA 3010A MOD	EPA 3050B EPA 3010A EPA 3010A MOD	EPA 3050B
Aluminum	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Antimony	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Arsenic	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Barium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Beryllium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Boron	EPA 6010B EPA 6010C	----------	EPA 200.7 EPA 6010B EPA 6010C	EPA 6010B EPA 6010C	EPA 6010B EPA 6010C
Cadmium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Calcium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Chromium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Cobalt	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Copper	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Iron	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Lead	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Molybdenum	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Magnesium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Manganese	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Mercury	EPA 7471A EPA 7471B	----------	EPA 245.1 EPA 7470A	EPA 7470A	EPA 7471A EPA 7471B

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Nickel	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Potassium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Selenium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Silicon	----------	----------	EPA 6010C	EPA 6010C	EPA 6010C
Silver	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Sodium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Strontium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Thallium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	----------	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Tin	EPA 6010B EPA 6010C	----------	EPA 200.7 EPA 6010B EPA 6010C	EPA 6010B EPA 6010C	EPA 6010B EPA 6010C

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Titanium	---------------	-----------	EPA 200.7 EPA 6010B EPA 6010C	EPA 200.7 EPA 6010B EPA 6010C	EPA 200.7 EPA 6010B EPA 6010C
Vanadium	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Zinc	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 200.8 MOD EPA 6020 EPA 6020A	EPA 200.7 EPA 200.8 EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A	EPA 6010B EPA 6010C EPA 6020 EPA 6020A
Zirconium	---------------	-----------	EPA 200.7 EPA 6010B EPA 6010C	EPA 200.7 EPA 6010B EPA 6010C	EPA 200.7 EPA 6010B EPA 6010C
Purgeable Organics (Volatiles)					
Volatile Preparation	---------------	----------	EPA 5030A EPA 5030B	EPA 5030A EPA 5030B	EPA 5035 EPA 5035A
Acetone	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Acetonitrile	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Acrolein	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Acrylonitrile	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Alpha Methyl Styrene	---------------	EPA TO-15	---------------	---------------	---------------
Allyl Chloride	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
tert-Amyl Alcohol	-----------	---------	------------------	---------------	EPA 8260B EPA 8260C
tert-Amyl Methyl Ether	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
tert-Butyl Alcohol	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
tert-Butyl formate	--------------	---------	-----------------	----------------	EPA 8260B EPA 8260C
Benzene	---------------	EPA TO-15 EPA TO- 15 SIM EPA 18 mod EPA 25 mod	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
Benzyl Chloride	---------------	EPA TO-15	---------------	---------------	---------------
Bromobenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Bromochloromethane	---------------	-----------	EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Bromodichloromethane	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Bromoethene	---------------	EPA TO-15	---------------	---------------	---------------
Bromoform	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Bromomethane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Butane	--------------	EPA 18 mod EPA 25 mod	------------------	------------------	---------------
1,3-Butadiene	---------------	EPA TO-15 EPA TO-15 SIM	-----------	-----------	-----------
2-Butanone	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
n-Butylbenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
sec-Butylbenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
tert-Butylbenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Carbon Disulfide	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Carbon Tetrachloride	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
2-Chloro-1,3-Butadiene	---------------	-----------	EPA 624 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Chloroacetonitrile	---------------	-----------	EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Chlorobenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1-Chlorobutane	---------------	-----------	EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Chlorodifluoromethane	---------------	EPA TO-15	-----------	-----------	-----------
Chloroethane	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
2-Chloroethyl Vinyl Ether	---------------	-----------	EPA 624 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Carbon Range Organics C1-C10 (including subsets of this range i.e. hydrocarbons as propane, hydrocarbons as methane, hydrocarbons as hexane)	---------------	EPA 18 mod EPA 25 mod	------------------	----------------	--------------
Chloroform	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Chloromethane	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
3-Chloroprene	---------------	EPA TO-15	-----------	-----------	-----------
2-Chlorotoluene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
4-Chlorotoluene	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Cyclohexane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Di-Isopropyl Ether	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Dibromochloromethane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,2-Dibromo-3-chloropropane	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8011 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8011 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Dibromomethane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,2-Dibromoethane (EDB)	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8011 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8011 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,2-Dichlorobenzene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,3-Dichlorobenzene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,4-Dichlorobenzene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
trans-1,4-Dichloro-2-Butene	---------------	---------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Dichlorodi- fluoromethane	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1-Dichloroethane	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,2-Dichloroethane	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1-Dichloroethene	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
cis-1,2-Dichloroethene	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
trans-1,2-Dichloroethene	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Dichlorofluoromethane	---------------	EPA TO-15	EPA 524.2 (DW)	-----------	-----------
1,2-Dichloropropane	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,3-Dichloropropane	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
2,2-Dichloropropane	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1-Dichloropropanone	---------------	-----------	EPA 524.2 (DW)	-----------	-----------

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
1,1-Dichloropropene	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
cis-1,3-Dichloropropene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
trans-1,3-Dichloropropene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,4-Dioxane	---------------	EPA TO-15	EPA 8260B EPA 8260C EPA 8260 SIM	EPA 8260B EPA 8260C EPA 8260 SIM	EPA 8260B EPA 8260C EPA 8260 SIM
Ethanol	---------------	EPA TO-15	EPA 8260B EPA 8260C EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Ethane	---------------	EPA 18 mod EPA 25 mod	-----------	-----------	-----------
Ethyl Acetate	---------------	EPA TO-15	-----------	-----------	-----------
Ethyl Acrylate	---------------	EPA TO-15	-----------	-----------	-----------
Ethylbenzene	---------------	EPA TO-15 EPA TO- 15 SIM EPA 18 mod EPA 25 mod	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
Ethyl Ether	---------------	----------	EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Ethyl Methacrylate	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
4-Ethyltoluene	---------------	EPA TO-15	-----------	-----------	-----------

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Ethyl tert-Butyl Ether	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Freon-113	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Freon-114	---------------	EPA TO-15	-----------	-----------	-----------
Gasoline Range Organics (GRO) [Volatile Petroleum Hydrocarbons (VPH)]	---------------	-----------	EPA 8015B EPA 8015C EPA 8015D EPA 8260B EPA 8260C NW TPH-Gx MA VPH WA DOE VPH OA-1	EPA 8015B EPA 8015C EPA 8015D EPA 8260B EPA 8260C NW TPH-Gx MA VPH WA DOE VPH OA-1	EPA 8015B EPA 8015C EPA 8015D EPA 8260B EPA 8260C NW TPH-Gx MA VPH WA DOE VPH OA-1
Heptane	---------------	EPA TO-15	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Hexane	---------------	EPA TO-15 EPA 18 mod EPA 25 mod	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
2-Hexanone	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Hexachlorobutadiene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Hexachloroethane	---------------	EPA TO-15	EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Isooctane	---------------	EPA TO-15	-----------	-----------	-----------
Isopropyl Alcohol	---------------	EPA TO-15	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Isopropylbenzene	---------------	EPA TO-15	EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260COA-1
1,4-Isopropyltoluene	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methane	---------------	EPA 18 mod EPA 25 mod	-------------------	------------------	---------------
Methylacrylonitrile	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methyl Acetate	---------------	-----------	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methyl Acrylate	---------------	EPA TO-15	EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methyl Iodide	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methyl Ethyl Ketone	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methylene Chloride	---------------	EPA TO-15 EPA TO- 15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methyl Isobutyl Ketone	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methyl Methacrylate	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Methyl tert-Butyl Ether	---------------	EPA TO-15 EPA TO-15 SIM EPA 18 mod EPA 25 mod	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
4-Methyl-2-pentanone	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Methylcyclohexane	---------------	-----------	EPA 624 EPA 8260B EPA 8260C	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
2-Nitropropane	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Naphthalene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
Nitrobenzene	---------------	-----------	EPA 524.2 (DW)	-----------	-----------
Octane	---------------	EPA TO-15	-----------	-----------	-----------
Pentachloroethane	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Pentane	---------------	EPA TO-15 EPA 18 mod EPA 25 mod	-----------	-----------	-----------
Propionitrile	---------------	-----------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Propane	---------------	EPA 18 mod EPA 25 mod	-------------------	----------------	---------------

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Propene	---------------	EPA TO-15	-----------	-----------	-----------
n-Propylbenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Styrene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 602 EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
tert-Amyl Ethyl Ether	---------------	-----------	EPA 8260B EPA 8260C EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1,1,2-Tetrachloroethane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1,2,2-Tetrachloroethane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Tetrachloroethene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Tetrahydrofuran	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW)	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Toluene	---------------	EPA TO-15 EPA TO-15 SIM EPA 18 mod EPA 25 mod	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
1,2,3-Trichlorobenzene	---------------	---------	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
1,2,4-Trichlorobenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1,1-Trichloroethane	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,1,2-Trichloroethane	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Trichloroethene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Trichlorofluoromethane	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,2,3-Trichloropropane	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,2,4-Trimethylbenzene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
1,3,5-Trimethylbenzene	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Vinyl Acetate	---------------	EPA TO-15	EPA 624 EPA 8260B EPA 8260C EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Vinyl Chloride	---------------	EPA TO-15 EPA TO-15 SIM	EPA 624 EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B	EPA 8260B EPA 8260C	EPA 8260B EPA 8260C
Xylenes, total	---------------	EPA TO-15 EPA TO-15 SIM EPA 18 mod EPA 25 mod	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
1,2-Xylene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
1,3-Xylene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
1,4-Xylene	---------------	EPA TO-15 EPA TO-15 SIM	EPA 602 EPA 624 EPA 8021B EPA 8260B EPA 8260C EPA 524.2 (DW) EPA 6200B OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1	EPA 8021B EPA 8260B EPA 8260C OA-1
Extractable Organics (Semivolatiles)					
Organic Extraction	EPA 3540C EPA 3546 EPA 3550B EPA 3550C	---------	EPA 3510C EPA 3511	EPA 3510C EPA 3511	EPA 3540C EPA 3546 EPA 3550B EPA 3550C

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Acenaphthene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270C SIM EPA 8270D EPA 8270D SIM	EPA 8270C EPA 8270C SIM EPA 8270D EPA 8270D SIM	EPA 8270C EPA 8270C SIM EPA 8270D EPA 8270D SIM
Acenaphthylene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270C SIM EPA 8270D EPA 8270D SIM	EPA 8270C EPA 8270C SIM EPA 8270D EPA 8270D SIM	EPA 8270C EPA 8270C SIM EPA 8270D EPA 8270D SIM
Acetic Acid	---------------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	---------
Acetophenone	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Acetylaminofluorene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Alkylated PAHs	EPA 8270C SIM EPA 8270D SIM	---------	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM
4-Aminobiphenyl	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Amino-4,6-dinitrotoluene	---------------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
4-Amino-2,6-dinitrotoluene	---------------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
Aniline	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Anthracene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Atrazine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Benzaldehyde	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Benzidine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Benzoic Acid	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Benzo (a) Anthracene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Benzo (b) Fluoranthene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Benzo (k) Fluoranthene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Benzo (ghi) Perylene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Benzo (a) Pyrene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Benzo (e) Pyrene	EPA 8270C SIM EPA 8270D SIM	---------	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM
Benzyl Alcohol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Biphenyl	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Bis (2-chloroethoxy) Methane	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Bis (2-chloroethoxy) Ether	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Bis (2-chloroethyl) Ether	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Bis (2-chloroisopropyl) Ether	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Bis (2-ethylhexyl) Phthalate	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
4-Bromophenylphenyl Ether	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Butyl benzyl Phthalate	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Butyric Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Caprolactam	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Carbazole	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Carbon Range Organics C8-C44 (including subsets of this range i.e. HRO, MRO, ORO, RRO)	---------	---------	EPA 8015B EPA 8015C EPA 8015D EPA 8270C TN EPH	EPA 8015B EPA 8015C EPA 8015D EPA 8270C TN EPH	EPA 8015B EPA 8015C EPA 8015D EPA 8270C TN EPH
4-Chloroaniline	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
4-Chloro-3-methylphenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Chlorobenzilate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1-Chloronaphthalene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Chloronaphthalene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
2-Chlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
4-Chlorophenyl Phenyl Ether	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Chrysene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Citric Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Cresols (Methyl Phenols)	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
cis-/trans-Diallate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,4-Diamino-6-nitrotoluene	---------	---------	EPA 8330B	EPA 8330B	EPA 8330B
2,6-Diamino-4-nitrotoluene	---------	---------	EPA 8330B	EPA 8330B	EPA 8330B
Dibenzo (a,h) Acridine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Dibenzo (a,h) Anthracene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Dibenzofuran	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270D SIM
Dibenzothiophene	EPA 8270C SIM EPA 8270D SIM	---------	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM
1,2-Dichlorobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,3-Dichlorobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,4-Dichlorobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
3,3-Dichlorobenzidine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Diesel Range Organics (DRO) [Extractable Petroleum Hydrocarbons (EPH)]	---------	---------	EPA 8015B EPA 8015C EPA 8015D EPA 8270C CT ETPH MA EPH NWTPH DX NJ EPH TX1005/ TX1006 WADOE EPH OA-2	EPA 8015B EPA 8015C EPA 8015D EPA 8270C CT ETPH MA EPH NWTPH DX NJ EPH TX1005/ TX1006 WADOE EPH OA-2	EPA 8015B EPA 8015C EPA 8015D EPA 8270C CT ETPH MA EPH NWTPH DX NJ EPH TX1005/ TX1006 WADOE EPH OA-2
2,4-Dichlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,6-Dichlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Diethyl Phthalate	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Dimethoate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
p-Dimethylaminoazobenzene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
7,12-Dimethylbenz (a) Anthracene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
alpha-,alpha-Dimethyphenethylamine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,4-Dimethylphenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Dimethyl Phthalate	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
3,3-Dimethylbenzidine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Di-n-butyl Phthalate	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Di-n-octyl Phthalate	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
3,5-Dinitroaniline	---------	---------	EPA 8330B	EPA 8330B	EPA 8330B
1,3-Dinitrobenzene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B
2,4-Dinitrophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,4-Dinitrotoluene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B
2,6-Dinitrotoluene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B
1,4-Dioxane	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Diphenylamine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Diphenyl Ether	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,2-Diphenylhydrazine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Ethyl Methane Sulfonate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Fluoroanthene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Fluorene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Formic Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Hexachlorobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Hexachlorobutadiene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Hexachlorocyclo-pentadiene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Hexachloroethane	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Hexachloropropene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	--------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
Indeno (1,2,3-cd) Pyrene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Isodrin	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Isophorone	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Isosafrole	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Isobutyric Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Lactic Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Methapyriline	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
3-Methycholanthrene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
2-Methyl-4,6-Dinitrophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Methyl Methane Sulfonate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1-Methylnaphthalene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
2-Methylnaphthalene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270C SIM EPA 8270D SIMEPA 8270D	EPA 8270C EPA 8270C SIM EPA 8270D SIM EPA 8270D
2-Methylphenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
4-Methylphenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Naphthalene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
1,4-Naphthoquinone	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1-Naphthylamine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Naphthylamine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
4-Nitroquinoline-1-oxide	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Nitroaniline	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
3-Nitroaniline	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
4-Nitroaniline	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Nitrobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B	EPA 8270C EPA 8270D EPA 8330 EPA 8330A EPA 8330B
Nitroglycerin	---------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
2-Nitrophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
4-Nitrophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Nitrotoluene	---------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
3-Nitrotoluene	---------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
4-Nitrotoluene	---------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
5-Nitro-o-toluidine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitroso-di-n-butylamine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosodiethylamine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosodimethylamine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosodimethylethylamine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosomorpholine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosodi-n-propylamine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosodiphenylamine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
n-Nitrosopiperidine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
n-Nitrosopyrrolidine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	---------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
Oxalic Acid	---------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	---------
2,2-Oxybis (1-chloropropane)	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Pentachlorobenzene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Pentachloronitrobenzene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Pentachlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Pentaerythritol Tetranitrate (PETN)	-----------	-----------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
Perylene	EPA 8270C SIM EPA 8270D SIM	---------	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM	EPA 8270C SIM EPA 8270D SIM
Petroleum Range Organics	-----------	-----------	FLPRO	FLPRO	FLPRO
Phenacetin	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Phenanthrene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Phenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,4-Phenylenediamine	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2-Picoline	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Pronamide	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Propionic Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	---------

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
Pyrene	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	---------	EPA 625 EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM	EPA 8270C EPA 8270D EPA 8270C SIM EPA 8270D SIM
Pyridine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Pyruvic Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Quinic Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Succinic Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Tartaric Acid	--------	---------	EPA 8015B EPA 8015D	EPA 8015B EPA 8015D	--------------
Safrole	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,2,4,5-Tetrachlorobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,3,4,6-Tetrachlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Tetraethyl Dithiopyrophosphate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
Tetryl	--------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
Thionazin	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
o-Toluidine	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,2,4-Trichlorobenzene	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,3,5-Trinitrobenzene	--------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
2,4,5-Trichlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,4,6-Trichlorophenol	EPA 8270C EPA 8270D	---------	EPA 625 EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D

Parameter/Analyte	**Tissue**	**Air**	**Nonpotable Water (*DW)**	**Solid Hazardous Waste**	
				Aqueous	**Solid**
O,O,O-Tri-ethylphosphorothioate	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
1,3,5-Trinitrobenzene	EPA 8270C EPA 8270D	---------	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D	EPA 8270C EPA 8270D
2,4,6-Trinitrotoluene	---------	---------	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B	EPA 8330 EPA 8330A EPA 8330B
Pesticides/Herbicides/ PCBs					
Organic Extraction	EPA 3540C EPA 3546 EPA 3550B EPA 3550C	---------	EPA 3510C EPA 3511	EPA 3510C EPA 3511	EPA 3540C EPA 3546 EPA 3550B EPA 3550C
Acifluorfen	---------	---------	EPA 8151A	EPA 8151A	EPA 8151A
Aldrin	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Azinphos Methyl (Guthion)	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
alpha-BHC	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
beta-BHC	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
delta-BHC	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
gamma-BHC (Lindane)	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Bentazon	---------	---------	EPA 8151A	EPA 8151A	EPA 8151A
Bolstar	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
alpha-Chlordane	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Chloramben	---------	---------	EPA 8151A	EPA 8151A	EPA 8151A
Chlordane (technical)	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Chlorobenzilate	---------	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Chlorpyrifos	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Coumaphos	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
2,4-D	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
2,4'-DDD	EPA 8081A EPA 8081B	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
2,4'-DDE	EPA 8081A EPA 8081B	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
2,4'-DDT	EPA 8081A EPA 8081B	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Dalapon	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
2,4-DB	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
4,4'-DDD	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
4,4'-DDE	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
4,4'-DDT	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Demeton-O	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Demeton-S	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Diallate	---------	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Diazinon	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
1.2-Dibromo-3-chloropropane (DBCP)	---------	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Dicamba	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
3,5-Dichlorobenzoic Acid	---------	---------	EPA 8151A	EPA 8151A	EPA 8151A
Dichlorvos	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Dichloroprop	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
Dieldrin	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Dinoseb	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
Disulfoton	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Diuron	---------	---------	EPA 8321A	EPA 8321A	EPA 8321A
Endosulfan I (alpha)	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Endosulfan II (beta)	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Endosulfan Sulfate	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Endrin	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Endrin Aldehyde	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Endrin Ketone	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Ethion	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Ethoprop	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Fensulfothion	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Fenthion	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Fenuron	---------	---------	EPA 8321A	EPA 8321A	EPA 8321A
Gamma-chlordane	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Heptachlor	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Heptachlor Epoxide	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Hexachlorobenzene	EPA 8081A EPA 8081B	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Hexachlorocyclopentadi ene	---------	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Isodrin	---------	---------	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Malathion	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
MCPA	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
MCPP	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
Merphos	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Methoxychlor	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Mevinphos	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Mirex	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Parathion Ethyl	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Parathion Methyl	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
PCB-1016 (Arochlor)	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1221	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1232	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1242	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1248	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1254	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1260	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1262	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB-1268	EPA 8082 EPA 8082A	---------	EPA 608 EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
Aroclor 5432	----------	---------	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
Aroclor 5442	----------	---------	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
Aroclor 5460	----------	---------	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A	EPA 8082 EPA 8082A
PCB Congeners (209)	EPA 1668	---------	EPA 1668	EPA 1668	EPA 1668
Pentachlorophenol (PCP)	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
Phorate	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Picloram	---------	---------	EPA 8151A	EPA 8151A	EPA 8151A

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Simazine	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Stirophos (Tetrachlorvinphos)	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
2,4,5-T	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
Tokuthion (Prothiofos)	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
2,4,5-TP (Silvex)	EPA 8151A	---------	EPA 8151A	EPA 8151A	EPA 8151A
Toxaphene	EPA 8081A EPA 8081B	---------	EPA 608 EPA 8081A EPA 8081B	EPA 8081A EPA 8081B	EPA 8081A EPA 8081B
Trichloronate	---------	---------	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B	EPA 8141A EPA 8141B
Dioxins/Furans					
2,3,7,8-TCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
2,3,7,8-TCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,7,8-PeCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
2,3,4,7,8-PeCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,7,8-PeCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,4,7,8-HxCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,6,7,8-HxCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
2,3,4,6,7,8-HxCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,7,8,9-HxCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,4,7,8,-HxCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,6,7,8-HxCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,7,8,9-HxCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,4,6,7,8-HpCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,4,7,8,9-HpCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
1,2,3,4,6,7,8-HpCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
OCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
OCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total HpCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total HpCDF	EPA 1613B EPA 8290A	----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total HxCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total HxCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total PeCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total PeCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total TCDD	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Total TCDF	EPA 1613B EPA 8290A	-----------	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A	EPA 1613B EPA 8290A
Misc. Headspace Analysis					
Carbon Dioxide	---------	---------	RSK-175	RSK-175	---------
Ethane	---------	---------	RSK-175	RSK-175	---------
Ethene	---------	---------	RSK-175	RSK-175	---------
Methane	---------	---------	RSK-175	RSK-175	---------
Hazardous Waste Characteristics					
Toxicity Characteristic Leaching Procedure	---------	---------	---------	EPA 1311	EPA 1311
Synthetic Precipitation Leaching Procedure	---------	---------	---------	EPA 1312	EPA 1312
Other					
Perchlorate	---------	---------	EPA 6850	EPA 6850	EPA 6850
Hydrazine	---------	---------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
Formaldehyde	---------	---------	- - - - - - - - - -	EPA 8315A	EPA 8315A
Methylhydrazine	---------	---------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
1,1-Dimethylhydrazine	---------	---------	EPA 8315A MOD	EPA 8315A MOD	EPA 8315A MOD
Volatile Preparation	---------	---------	EPA 5030A EPA 5030B	EPA 5030A EPA 5030B	EPA 5035 EPA 5035A

Parameter/Analyte	Tissue	Air	Nonpotable Water (*DW)	Solid Hazardous Waste	
				Aqueous	Solid
Organic Extraction	EPA 3540C EPA 3546 EPA 3550B EPA 3550C	---------	EPA 3510C EPA 3511	EPA 3510C EPA 3511	EPA 3540C EPA 3546 EPA 3550B EPA 3550C
Perfluorinated Alkyl Acids (PFAAs)					
N-ethyl perfluorooctane-sulfonamidoacetic acid (NEtFOSAA)			EPA 537 MOD (DW and NPW)	EPA 537 MOD	
N-methyl perfluorooctane-sulfonamidoacetic acid (NMeFOSAA)			EPA 537 MOD (DW and NPW)	EPA 537 MOD	
Perfluorobutanesulfonate			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorodecanoic acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorododecanoic acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluoroheptanoic acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorohexanesulfonate			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorohexanoic Acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorononanoic Acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluoro-octanesulfonate			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorooctanoic Acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorotetradecanoic Acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluorotridecanoic Acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
Perfluoroundecanic Acid			EPA 537 MOD (DW and NPW)	EPA 537 MOD	EPA 537 MOD
8:2 Fluorotelomersulfonate			EPA 537 MOD	EPA 537 MOD	

* **DW noted in parenthesis for drinking water method**