NEW YORK STATE | Department of Environmental Conservation

KATHY HOCHUL
Governor

AMANDA LEFTON
Commissioner

June 12, 2026

Curia New York (formerly AMRI)
Attention: Ed Leighton
33 Riverside Avenue
Rensselaer, NY 12144
(Sent by email only ed.leighton@curiaglobal.com)

RE: Approval -- June 2026 Excavation Work Plan
Sterling Drug Site 1 (Curia), NYSDEC Site No. 442009

Dear Ed Leighton:

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) have reviewed the June 2, 2026 version of the Excavation Work Plan (June2026 EWP) submitted by CHA on behalf of Curia New York for the Sterling Drug Site 1 site in Rensselaer, with NYSDEC site number 442009.

The June2026 EWP is hereby approved.

Please contact me at 518-357-2394 if there are any questions.

Sincerely,

FOR

Christopher O'Neill, P.E.
Professional Engineer 2

ecc: E. Leighton, Curia
S. Miller, CHA
A. Keegan, NYSDOH
J. Deming, NYSDOH
M. Murphy, NYSDEC

EXCAVATION WORK PLAN

Curia New York
Sterling Drug Site 1
33 Riverside Avenue,
Rensselaer, New York

NYSDEC Inactive Hazardous Waste Site Number: 442009

CHA Project Number: 075104.001

May 2025
Revised October 2025
Revised May 2026
Revised June 2026

Prepared for:
Curia New York, Inc.
33 Riverside Avenue
Rensselaer, New York 12144

Prepared by:
CHA Consulting, Inc.
III Winners Circle
Albany, New York 12205
Phone: (518) 453-4500

CERTIFICATION

I, Samantha J. Miller, certify that I am currently a NYS registered professional engineer and that this Excavation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, the undersigned, of CHA Consulting, Inc. have been designated by the Site owner to sign this certification for the Site.

For CHA Consulting, Inc.:

(Professional Seal)

Samantha J. Miller, P.E.
Printed Name of Certifying Engineer

Signature of Certifying Engineer

June 2, 2026
Date of Certification

103303
NYS Professional Engineer Registration Number

CHA Consulting, Inc.
Company

Senior Engineer V
Title

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List of Acronyms & Abbreviations

1,2-DCA	1,2-Dichloroethane
AMRI	Albany Molecular Research, Inc.
BUD	Beneficial Use Determination
C&D	Construction and Demolition
CAMP	Community Air Monitoring Program
COCs	Contaminants of Concern
Curia	Curia New York
CRZ	Contamination Reduction Zone
DUSR	Data Usability Summary Report
DER	Division of Environmental Remediation
ELAP	Environmental Laboratory Approval Program
EH&S	Environmental Health and Safety
EMI	Earth Movers, Inc.
EWP	Excavation Work Plan
EZ	Exclusion Zone
FTL	Field Team Leader
GCTS	Groundwater Collection and Treatment System
HASP	Health and Safety Plan
HSC	Health and Safety Coordinator
IDLH	Immediate Danger to Life or Health
IP	Ionization Potential
NIOSH	National Institute for Occupational Safety and Health
NYCRR	New York Codes, Rules and Regulations
NYS	New York State

List of Acronyms & Abbreviations (cont.)

NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PFAS	Per-and polyfluoroalkyl Substances
PID	Photoionization Detector
PM	Project Manager
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
REL	Recommended Exposure Limits
RCRA	Resource Conservation and Recovery Act
SCO	Soil Cleanup Objective
SCG	Soil Cleanup Guidance
SDS	Safety Data Sheet
SIM	Selected Ion Monitoring
SOP	Standard Operating Procedure
SSO	Site Safety Operator
Sterling	Sterling Organics
SVOC	Semivolatile Organic Compound
TAGM	Technical Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TWA	Time-Weighted Average
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant
bgs	Below the ground surface
eV	Electronvolt
ppm	Parts per million

1.0 INTRODUCTION

Curia New York (Curia), formerly known as Albany Molecular Research Inc. (AMRI) Rensselaer Sterling Drug Site 1, is a pharmaceutical product manufacturing plant located at 33 Riverside Avenue, in Rensselaer, New York (Figure 1). Sterling Drug entered into an Order/Agreement with the New York State Department of Environmental Conservation (NYSDEC) in 1983 and is currently classified as NYSDEC Site #442009. The property defined within that Order/Agreement will be referred to as the "Site" throughout the following sections, except that the warehouse property (referred to as Sector H below) is included in the Site definition by the 1983 Order/Agreement but is NOT included as subject to this general Excavation Work Plan.

1.1 Purpose

The purpose of this Excavation Work Plan (EWP) is to define a framework for proper management of soil excavated at the Site in accordance with New York State (NYS) and Federal environmental regulations and governing Site documents. The EWP is required as part of continued management of the Site as a Class 4 Inactive Hazardous Waste Disposal Site.

Upon NYSDEC approval of the EWP, the procedures outlined will be followed when conducting any excavation or soil disturbance at the Site. The EWP provides requirements and guidance to Curia personnel and outside contractors and describes provisions for the following:

- Site controls (e.g. work zone access/security);
- Excavation, segregation and stockpiling of excavated soils;
- Sampling and characterization for final disposition (e.g. off-site disposal);
- Fluids management;
- Cover system restoration;
- Backfill and imported fill requirements;
- Stormwater pollution prevention;
- Contingency plan;
- Community Air Monitoring;
- Dust and Odor Controls;
- Decontamination; and
- Reporting.

1.2 Site History

The Site has been historically owned and operated by pharmaceutical manufacturing companies including; Organichem, Nycomed, Amersham and Sterling Organics (Sterling) since 1882. Sterling historically managed and landfilled industrial and hazardous wastes generated at the Site

which included, but were not limited to, pharmaceutical intermediates, finished pharmaceutical products, organic impurities with activated carbon, filter cakes, filter aids, hydrated lime, solvents, still bottoms, oils and wood. The Site is currently identified as the location of the Sterling Drug Site 1 Class 4 State Inactive Hazardous Waste Site (Site code: 442009) regulated by the NYSDEC. Required Institutional and Engineering Controls at the Site include a groundwater collection and treatment system (GCTS) in the vicinity of Building 30.

1.3 Geology/Hydrogeology

1.3.1 Surficial Geology

According to the United States Department of Agriculture (USDA) Web Soil Survey, the soil beneath the Site is indicative of Urban Land. Urban Land refers to soil material having a non-agricultural, manmade surface layer produced by mixing and filling in urban and suburban areas.

Based on a 1983 report titled Interim Report: Phase I – Preliminary Site Investigation (Dames & Moore, Inc. 1983), unconsolidated material consists of surficial manmade fill underlain by various types of glacial deposits (from top to bottom): coarse sand and gravel alluvial/glacial deposits, silty clay/laminated clay, lake deposited till, glacial sand and gravel outwash, and glacial till.

1.3.2 Bedrock Geology

Bedrock was encountered in one boring (Boring No. 10) during the 1983 Phase I – Preliminary Site Investigation at a depth of 68 feet below the ground surface (bgs) and in a second boring (Boring No. 16) at a depth of 46 feet bgs during the 1984 groundwater containment and collection system design investigation. Bedrock beneath the Site is the Normanskill Formation, which consists of shale with minor mudstone and sandstone.

1.3.3 Hydrogeology and Groundwater Flow

The depth to groundwater beneath the Site ranges from approximately 6 feet bgs in monitoring well MW-5A to 14.5 feet bgs in monitoring well MW-8. A groundwater divide bisects at least a portion of the Site and is oriented northeast/southwest. Groundwater flow direction across the Site has been documented in many of the previous reports except the northeast corner. Groundwater on the west side of the divide flows towards the west/northwest; groundwater on the east side of the divide flows towards the southeast. The groundwater contour map from the October 2025 gauging event is included as Figure 2.

1.3.4 Contaminants of Concern

Primary contaminants of concern (COCs) at the Site include benzene, chlorobenzene, 1,2-dichloroethane (1,2-DCA), and toluene. Groundwater monitoring has been conducted for over 30 years at the Site and first began circa October 1982, focusing on the COCs and limited metals analysis in select monitoring wells as consistent with the Agreement and Determination dated 1983 between Sterling Drug, Inc. and NYSDEC. Based on the data collected from the groundwater monitoring events, there are minimal detections of these contaminants across the

Site, except for MW-3. The primary location of detections above groundwater standards is in and around MW-3, therefore in 2021 the list of evaluated parameters was expanded to include the full target compound list (TCL) VOCs.

Specifically, on-site and off-site groundwater characteristics can be summarized as follows:

- VOCs are typically highest at and near MW-3 which is located near the northeastern border of the property.

- A modified VOC list is utilized at all monitoring well locations, except for MW-3 and includes the four specific COCs. MW-5A, MW-6A, MW-8, MW-12, MW-14A, and MW-17 have had minor detections of these parameters at low levels.

- There are four groundwater monitoring wells located off-site which are monitored as part of the existing monitoring well network. These wells are sampled for the modified VOC list and have been no detections of COCs. These wells are not sampled for metals analysis.

- Arsenic and sodium are sampled in select wells across the site. MW-6A, MW-12, and MW-14A are sampled semi-annually for arsenic. MW-5A, MW-6A and MW-17 are sampled for sodium. There are typically detections of these parameters.

- Emerging contaminants 1,4-dioxane and per-and polyfluoroalkyl substances (PFAS) have been sampled at various events and locations across the site since at least 2018 as part of a statewide initiative. A comprehensive evaluation of these contaminants is summarized in the Biannual Groundwater Sampling and Analysis Reports which are submitted to the NYSDEC. Regulation and guidance surrounding these contaminants continues to evolve, however it is important to note that there is not currently a regulation which requires remedial investigation into these contaminants at this time for this Site. PFAS have been detected in the majority of the wells, with highest concentrations at monitoring wells MW-3, MW-8, and MW-14A. 1,4-dioxane has also been detected in many of the monitoring wells, with the highest detections being at MW-3 and MW-12. In a letter dated February 4, 2025, the NYSDEC requested the addition of PFAS and 1,4-dioxane analysis to the October/fall routine groundwater monitoring events beginning October 2025.

- Emerging contaminant sampling has also been added to the groundwater treatment system monitoring program per the direction of a letter dated February 4, 2025, from NYSDEC. The influent and effluent samples are analyzed on a monthly basis for both PFAS and 1,4-dioxane as of March 2025. It is important to note that the system was not originally designed to treat these parameters, however it does appear to be providing some level of treatment.

1.4 Notification Requirements

“Change of Use” is defined by Title 6 of the New York Codes, Rules and Regulations (NYCRR) Part 375 as “the transfer of title to all or part of property subject to an environmental restoration

project, the erection of any structure on such property, the creation of a park or other public or private recreational facility on such property, any activity that is likely to disrupt or expose hazardous substances or to increase direct human exposure, or any other conduct that will or may tend to significantly interfere with an ongoing or completed environmental restoration project". At least 60 days prior to any change of use at the Site, the NYSDEC must be notified via written correspondence.

In addition to the Change of Use notification, under the Agreement/Determination (order) dated 12/1/1983, the Department shall be provided notice for any excavating, drilling, sampling or any remedial work conducted at the Site and any off-site areas at least five days prior to the start of any intrusive activity that is anticipated to encounter existing Site soil or groundwater. The Site owner or their representative will notify the NYSDEC contacts listed in the table below. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. In accordance with the above provisions, intrusive activities will not commence without NYSDEC approval, and notification to NYSDEC will occur when the on-Site work is scheduled, facilitating NYSDEC Site visits.

Table 1: Notifications

Name	Contact Information
Christopher O'Neill, P.E., NYSDEC Project Manager	(518)-357-2394 christopher.oneill@dec.ny.gov
Aaron Keegan, Public Health Specialist, NYSDOH	(518) 408-1943 aaron.keegan@health.ny.gov
Site Control Section	DERSiteControl@dec.ny.gov

Note: Notifications are subject to change and will be updated as necessary.

- This notification will include: A detailed description of the work to be performed, including the location and aerial extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of the EWP;
- A statement that the work will be performed in compliance with the EWP and the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulation (CFR) 1910.120;
- Identification of disposal facilities for potential waste streams;

- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results; and
- Report submittal to NYSDEC.

A full listing of Site-related contact information is provided in Table 2 below.

Table 2: Site Contacts

Personnel	Company	Duties	Contact Information
Barbara Kucharczyk	Curia	VP, API Manufacturing U.S.	Office: (518) 433-7721 Cell: (518) 366-7307 Barbara.kucharczyk@curiaglobal.com
Ed Leighton	Curia	Associate Director, EH&S	Office: (518) 788-0791 Ed.leighton@curiaglobal.com
Stephen Kelley	Curia	Associate Director, EH&S	Office: (518) 433-7700 x 35325 Stephen.kelley@curiaglobal.com
Samantha Miller, P.E.	CHA Consulting, Inc.	Environmental Consultant	Office: (315) 257-7154 Cell: (915) 329-9898 Smiller@chasolutions.com
Keith Cowan, P.G.	CHA Consulting, Inc.	Environmental Consultant	Office: (518) 453-2899 Cell: (518) 466-8157 Kcowan@chasolutions.com

Note: Contact information is subject to change and will be updated as necessary.

Project work scopes will be documented separately and submitted for approval by the NYSDEC with each Change of Use notification, with the intent to be performed in compliance with the EWP and 29 CFR 1910.120, which governs hazardous waste operations and emergency response. Additionally, all work will be conducted in accordance with applicable federal, state, and local statutes, regulations, and guidance documents.

The NYSDEC project manager will review the notification and may impose additional requirements for excavation(s) that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations.

1.4.1 Health and Safety Plans

A Site-specific HASP for CHA personnel has been prepared to provide specific guidelines and establish procedures for the protection of on-site personnel during intrusive construction activities. A copy of the HASP is included in Appendix A. Contractors are responsible for providing their own HASP and will adhere to safety policies and company procedures provided by Curia.

The health and safety requirements for intrusive activities were developed in accordance with 29 CFR 1910 and 1926. While the HASP provides a basis for the overall plan, particularly relative

to environmental conditions, the Contractors are responsible for supplementing the plan with additional specific requirements as necessary (e.g. confined space program, lockout/tagout, hot work permits, etc.). Major elements of the plan include:

1. Health and safety risk or hazard analysis (i.e., physical or chemical hazard involved, concentration, primary hazard) for each site task or operation referenced in the work plan.
2. Employee training assignments to assure compliance with 29 CFR 1910.120 (e) including identification of the use of 24-Hour (part-time) and 40-Hour (full-time) OSHA trained on-site workers.
3. Personal protective level/equipment to be used for each site task or operation [29 CFR1910.120 (g)] selected as a result of the hazard analysis and consistent with OSHA Permissible Exposure Limits referenced in 29 CFR 1910.1000. This includes the identification of head, eye, ear, face, body, foot, skin, and respiratory protection necessary and the minimum level of protection that should be worn on-site at all times.
4. Medical surveillance requirements [29 CFR 1910.120 (f)] including the identification of the medical surveillance performed for 24-Hour and 40-Hour OSHA trained workers on-site, medical surveillance required for on-site workers to wear respirators, if necessary, and medical surveillance required should an on-site worker be overexposed.
5. Frequency and types of air monitoring (i.e., organic vapor, combustible gas, particulate), personnel monitoring (i.e., cold/heat, stress), and environmental sampling techniques and instrumentation, including methods of maintenance and calibration of equipment. This section should also list action levels, that when reached on the monitoring equipment, will cause operations to cease and further contingency actions to be taken.
6. Project control measures [29 CFR 1910.120 (d)] including the aerial designation of the exclusion, contamination reduction (i.e. decontamination of personnel, small equipment/hand tools, and large equipment), and support zones and identification of how site security will be accomplished.
7. Decontamination procedures [29 CFR 1910.120 (k)] for on-site personnel and equipment (small equipment/hand tools, and large equipment) including decontamination procedures to use in the event of an emergency as well as the identification of decontamination station equipment, and solutions.
8. Emergency response plan including location of and directions to the nearest hospital, fire/police emergency numbers, and communication procedures, on-site first aid available, acute exposure symptoms of hazards involved, and emergency procedures for injury within work zones, fire/explosion, equipment failure, and chemical exposure.
9. Confined space entry procedures, if required, including a description of the permit system, attendant duty/system, barricading of space, atmospheric testing requirements, lockout/tagout requirements, and specialized equipment used.
10. Spill containment program [29 CFR 1910.120 (j)].
11. Line of command on-site (identification of Contractor Health and Safety Supervisor onsite) as well as identification of management, advisors, medical support, fire/rescue support,

field team/work party, security personnel, and others, if deemed necessary in the HASP.

2.0 SOIL SCREENING AND SAMPLING METHODS

2.1 Soil Screening

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 NYCRR Part 375, a professional engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed ~~during~~ as part of the on-Site activities. ~~development, such as excavations for foundations and utility work, after issuance of the COC.~~

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil.

Field screening will include observation/examination for evidence of contamination (e.g. staining, odor) using a photoionization detector (PID) equipped with a 11.7 electronvolt (eV) strength lamp or higher. The PID should have a minimum detection range of 0.1 parts per million (ppm) to 9,000ppm and be calibrated daily (or before each use) according to manufacturer specifications. Note: PID screening will be utilized to screen soils for potential contamination from VOCs, but it is not expected to provide information regarding potential contamination from non-VOC compounds such as semi-volatile organic compounds (SVOCs) and arsenic. Rather, a sector-based approach will be utilized based on historical sampling and analysis.

2.2 Soil Sampling

2.2.1 Documentation Sampling

Documentation samples are samples that are collected for the purposes of documenting remaining contamination once excavation limits are achieved. At the conclusion of each excavation activity, the resulting subgrade will be sampled to document any contamination that may remain prior to the installation of foundations or utilities. The excavation will be backfilled with only NYSDEC-approved imported fill materials or NYSDEC-approved onsite reuse materials as described further in later sections.

The Site can be divided for practical purposes into 8 sectors, Sectors A through H, as illustrated on Figure 3. Sector H is not currently owned/operated by Curia New York, so Sector H is not covered by this EWP. Documentation sampling and analyses will be performed for excavations in Sectors A through G as follows:

- One bottom sample for every 900 square feet of bottom area, except for:

- Soil samples will not be collected in excavations where no soil is removed (for example, blacktop repairs);

- Soil samples will not be required for excavations less than 25 square feet in area AND less than 2 feet in depth; and

If multiple small excavations are needed, then one bottom sample will be collected from a single excavation within each exclusion area (for example, repairs to a cluster of bollards). Changes to soil sample frequency must be approved by the NYSDEC project manager. Requested changes will be provided as part of the specific excavation project notification package, and will include justification, such as proximity and depth to recent laboratory analytical results approved by the NYSDEC project manager, multiple excavations in close proximity to one another, or an excavation extending across sector 'boundaries'.

Soil samples will be analyzed for the following parameters:

- 1,4-dioxane by USEPA Method 8270 SIM for samples from Sectors B and C
- PFAS by USEPA Method 1633A for samples from Sectors A, B, C, and E.
- Target Compound List (TCL) volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260 from Sectors A, B, C, D, E, F, and G
- TCL semi-volatile organic compounds (SVOCs) by USEPA Method 8270 from Sectors A, B, C, D, E, F, and G
- TCL Arsenic by USEPA Method 6010D from Sectors A, C, D, E, F, and G

Analytical results from soil samples will be reported with Category B deliverables and will be accompanied by a Data Usability Summary Report (DUSR). Composite samples (i.e., SVOCs, 1,4-dioxane, arsenic, and PFAS samples) will be produced from 5 aliquot subsamples (described further in Section 2.2.3). Soil sample locations will be documented by photographic and Global Position System (GPS) location identification and by standard soil descriptions using the unified soil classification system (USCS) in accordance with ASTM D2488 - Standard Practice for Description and Identification of Soils.

In addition to documentation samples, soil samples will be collected for all material leaving Site at a frequency required by the landfill and NYSDEC Division of Materials Management as described further in the sections below.

If groundwater is encountered within an excavation, the groundwater (as grab samples similarly to test pitting samples) will be sampled and analyzed in accordance with the parameters detailed above for soil documentation sampling.

2.2.2 Contained-In Determination

As discussed in previous sections, the COCs at the Site include VOCs; benzene, toluene and 1,2-DCA, each of which are listed hazardous waste compounds per 6 NYCRR Part 371.

However, the NYSDEC "Contained-in" policy is designed to allow soil, sediment, and groundwater contaminated with a listed hazardous waste to be disposed of in a solid waste facility if the concentrations of the listed contaminants are below certain levels and characteristic waste sampling has been completed and are below guidance levels.

Proper disposal and associated sampling and analyses for waste materials generated from actions performed pursuant to this EWP will be conducted in accordance with all applicable federal, state, and local statutes, regulations and guidance, including but not limited to 6 NYCRR Part 360 series, 6 NYCRR Part 370 series, and NYSDEC Division of Materials Management Contained-In Determination Policy.

2.2.2.1 Off-Site Disposal Sampling

Depending on the anticipated amount of soil that will be excavated for off-Site disposal and the amount of space available on-Site to stage the excavated soils, it may be preferrable to direct load the material to be disposed of off-Site directly into trucks for immediate hauling to the disposal facility. Direct loading of the materials requiring off-Site disposal will also reduce the need to handle the material multiple times. If direct loading of materials is determined to be desirable, pre-excavation sampling and analysis will be required and communicated as part of the Change of Use Notification.

Waste Characterization Samples

The waste characterization sampling frequency will be specified by the disposal facility based upon the total volume of material requiring disposal. The anticipated disposal facility for non-hazardous soil is typically the Colonie Landfill. If soils generated need to be managed and disposed of as hazardous waste, then alternative sampling frequencies and parameters will be arranged with the hazardous waste disposal facility.

Typical sampling frequency at the Colonie Landfill is one sample per every 500 tons of material up to 2,000 tons. After 2,000 tons of material, one sample is required for every 1,000 tons. Unless otherwise specified by the disposal facility, samples collected for VOC analysis will be discrete grab samples and all other analyses will be performed on composite samples. The basic sampling methodology, as well as the analytical requirements, are described below.

Soil samples will be sent to a laboratory that is New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) accredited for analysis.

The parameters required for waste disposal characterization typically include:

- Toxicity Characteristic Leaching Procedure (TCLP) VOCs by EPA Method 8260.
- TCLP SVOCs by EPA Method 8270.
- Total polychlorinated biphenyl's (PCB)s by EPA Method 8082
- TCLP metals and cyanide by EPA Methods 6010/7471

- Hazardous Waste Characteristics as defined under RCRA8 including ignitability, corrosivity, and reactivity

Excavations which generate greater than 50 CY of soil will be segregated based on the individual excavation project. While intentional dilution of waste generally is not allowed, excavations which generate less than 50 CY will be consolidated specific to the Sector area from which they pertain (see Figure 3). For example, all bollard repairs, black top repairs, and catch basin repairs within Section B would be consolidated for waste characterization analyses and offsite disposal (unless prohibited by NYSDEC Division of Materials Management or the disposal facility). NOTE: the consolidation of excavated soil will require the roll-off or other collection container to be moved, without cross-contamination between locations, to each excavation location within the particular sector for protective and secure soil handling.If the roll-off must be moved, once filled, to another location while awaiting analytical and approvals, the roll-off will be clearly labeled (and dated) and will include the project location for tracking purposes.

Liquid Waste Determination

Water encountered in any excavation which requires handling, will be pumped into drums or polyethylene totes for characterization and off-site disposal. Groundwater grab samples will be collected from the drums or totes for laboratory analysis and analyzed in accordance with the requirements of the disposal facility. Groundwater and surface water runoff into excavations will not be directly discharged to the sewer/treatment plant. Excavations left open during precipitation events or overnight will be protected from inflow of surface runoff waters.

2.2.3 Sampling Protocols

Soil samples will be collected following the sampling and handling protocols described in the Standard Operating Procedures (SOPs) which are attached in Appendix B. Samples collected for VOCs will be collected as grab samples, all other parameters will be composited utilizing the methodology described below. These procedures follow industry standards and DER-10. Other observations (e.g., location, color, PID reading, etc.) will be noted on the soil sampling log or daily observation log. The following table indicates the sampling activity and its corresponding SOP. NOTE: Since PFAS sampling is included for some sampling locations, SOP #341 (see Table 3 below) needs to be consulted prior to collecting any samples for those locations.

Table 3: List of Standard Operating Procedures

Activity	SOP #
Sample Naming and Numbering	103
Chain of Custody	105
Sampling Perfluoroalkyl Substances and Perfluorinated Compounds	341
Soil Sampling	405
Small Equipment Decontamination	501
Decontamination of Personnel	505

Activity	SOP #
Residuals Management	507
Sample Containers, Volumes, Preservations and Holding Times	603
Quality Assurance/Quality Control Samples	605
Field Handling, Packaging, and Shipping	607
Observation Report	903

Note: Some portions of the SOPs may not be applicable

Grab Samples

Grab samples will be collected by personnel wearing a freshly donned pair of latex gloves (or equivalent) and appropriately decontaminated, stainless steel hand tools or disposable sampling tools. The samples will be immediately placed into the appropriately pre-preserved laboratory containers and labeled.

Composite Sampling

Composite samples will be collected from various depths and locations in each work area that is representative of the entire work zone. Each composite will be formed from five equally sized, discrete subsample soil samples. The samples will be collected by hand with a fresh pair of gloves or with appropriately decontaminated stainless steel hand tools or disposable sampling tools. The subsamples will then immediately be placed into a stainless-steel bowl and covered with aluminum foil (or equivalent) between the additions of each subsample. While composite sampling will not be utilized for samples collected for VOC analysis, the bowl will be covered between the additions of each subsample to minimize the potential for volatilization of any semi-volatile contaminants that may be present in the soil.

Once all five of the subsamples are added to the bowl, the soil samples will be thoroughly homogenized using a stainless-steel spoon/scoop and immediately transferred to the appropriate laboratory containers and managed in a similar manner as the grab samples. The locations of each soil subsample will be identified on a map or sketch in the daily log which will be provided to NYSDEC, along with the analytical results, in the final report.

The soil samples will be submitted to a laboratory certified under the New York State Department of Health (NYSDOH) ELAP for analysis following appropriate chain-of-custody protocols.

Excess soil generated from sample collection will be managed in a manner similar to the excavated soil. Samples for waste characterization purposes will be collected directly from the roll-off containers that are lined and covered with poly while awaiting characterization and approval. The roll-offs will be covered once active loading has ceased and at the end of each workday, , whichever is sooner. In the event precipitation is expected, the contractor will prepare excavation activities with contingencies to stop work and cover excavated materials quickly. Excavation may continue during periods of low-intensity precipitation provided that conditions do not result in runoff from staging piles or water accumulation within or leakage from

containers/rolloffs. If precipitation may affect the collected soils to the extent that runoff or accumulation has the potential to occur, the impacted areas will be promptly covered to prevent additional moisture from being absorbed by the soil. Samples will be collected at a frequency determined by the disposal facility.

3.0 SOIL STAGING METHODS

Soil exhibiting contamination with field screening methods as defined above will be segregated from soils not exhibiting contamination, and will be placed directly into lined roll-off containers or temporary soil containment pads in an area approved by Curia and the NYSDEC project manager, that will be protective of human health and the environment and will not hinder operations at the Site or the continuation of other construction activities. One additional roll-off container will be available on-Site at all times, in the event that segregation becomes necessary. Non-saturated contaminated soil may be direct loaded into lined roll-off containers and staged and labeled near the excavation area(s), for eventual off-site disposal, subsequent to waste characterization. The lining shall include a minimum of 10-mil polyethylene sheeting. Roll-off containers will be securely covered once active loading has ceased to minimize vapor generation and the potential for accumulation of rainwater within the container.

While the preference is to place material directly into lined roll-off containers or live-load material, if stockpiling is required, temporary soil containment pads will be constructed in accordance with the following:

- Prepare the subgrade, which shall consist of a stable subgrade where all visible sharps have been removed. The temporary soil containment area(s) shall be sufficiently large to contain all stockpiled material and be accessible to excavation equipment and trucks for eventual loading.

- A low point or sump shall be constructed on the temporary soil containment pad to collect any water generated from dewatering of the materials placed on the pad and the pad shall be graded toward the low point.

- Any liquid that accumulates on the temporary soil containment pad shall be containerized and characterized for evaluating off-site disposal options.

- A minimum of 20-mil polyethylene sheeting, with at least two feet of overlap at all seams, shall be placed on the subgrade. The top sheet shall be lapped over the bottom sheet in a shingle type pattern.

- A minimum of a one-foot high soil berm, hay bales, wood timbers, or similar shall be placed around the perimeter of the containment area to prevent saturated soil and/or water from migrating off the containment pad. Secure the edges of the sheets to keep the polyethylene sheeting in place.

- Erosion and sediment controls shall be erected around the perimeter of stockpiles,

including silt fence/silt socks at a minimum. Stormwater runoff shall be directed around all stockpiles and excavations. Note that the Site primarily consists of blacktop and includes drains which route back to the onsite Wastewater Treatment Plant (WWTP). There are no drains which directly discharge stormwater.

- Construct stockpiles at a height not exceeding 15 feet and with side slopes no steeper than 2H:1V.

- Stockpiles shall be kept covered at all times with appropriately anchored 10-mil polyethylene sheeting (minimum) or waterproof tarpaulins. Sheeting and tarpaulins will be installed with seams overlapped at least 1 foot. Stockpiles shall be routinely inspected. Ripped or damaged stockpile covers shall be promptly replaced.

- Maintain all stockpiles until material is disposed off-site.

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins. Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Stockpiles will be inspected at a minimum of once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site, available for inspection by the NYSDEC, and will be included in the Project report submitted to NYSDEC.

4.0 MATERIAL EXCAVATION AND LOAD-OUT

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports (i.e., in chain-of-command of the PE of record) to a PE who is licensed and registered in New York State will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

A site utility stakeout will be completed by the Contractor for all utilities prior to any ground intrusive activities at the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered (tight-fitting covers), manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation (NYSDOT) requirements (and all other applicable transportation requirements).

4.1 General Requirements

The following minimum procedures will be required for all intrusive activities:

1. Provide a minimum of three working days of notice to Dig Safely New York (1-800-962-7962) for utility clearance.

2. Establish Project/Site Controls, including, but not limited to the following:
    - Installation of appropriate sediment and erosion controls
    - Setup of appropriate work zones
    - Setup of air monitoring stations as required to comply with the requirements of the CAMP – Refer to Section 12.0 for details
    - Construction of containment pads
    - Construction of decontamination pads
3. Excavate Project soils utilizing field screening procedures. To minimize potential cross-contamination via tracking and reduce the amount of required decontamination, the following work practices will be implemented:
    - Efforts will be made to advance the excavation face towards the excavator such that the tracks on the machine do not come into contact with the impacted or potentially impacted soils.
    - Efforts will be made to minimize the amount of equipment and machinery that comes into contact with the impacted soils.
4. If field screening processes indicate a change in material is encountered (e.g. change in color, noticeable odors, etc.), the newly encountered material should be stockpiled and characterized separately.
5. If excavation beneath the water table is required, the material will need to be dewatered prior to transportation off-site for disposal. Additional measures will be implemented to collect all water on the containment pads for future off-site disposal (e.g. construction of a sump on containment pad).
6. All excavation faces will be covered with a minimum of 10-mil polyethylene sheeting at the end of each workday at a minimum.
7. Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered (tight-fitting covers), manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).
8. Locations where vehicles enter or exit the site shall be inspected periodically for evidence of off-site soil tracking. Impacted soil which is deposited/tracked/spilled beyond the immediate vicinity of the loading area will be swept/collected immediately upon discovery and added to work area soils awaiting off-site disposal.

4.2 Decontamination Pad Requirements

Prior to coming to the Site, at the start of each project, the excavator and any heavy equipment that is brought to the site will be appropriately decontaminated before intrusive work proceeds.

Should visible soil and debris be observed on the equipment, a temporary decontamination pad will be built, and the equipment shall be cleaned. Water from the decontamination process will be containerized and disposed of in accordance with Section 7.0 Fluids Management. During the on-Site activities, every effort will be made to prevent equipment (such as equipment tracks) from coming into contact with site soils whenever possible. Pieces of the equipment that contact the soil (e.g. excavator bucket), will be decontaminated prior to leaving the respective excavation/exclusion area.

A truck wash and decontamination pad will be operated on-site, if it becomes appropriate. These activities will be located within the "out-of-service" methanol tank farm chemical bulk storage (CBS) loading/unloading area if large decontamination is required. An appropriately sized decontamination pad will be constructed so that equipment can drive into the area for decontamination. If a delivery is occurring, the decontamination activities will be removed and will resume after the delivery has ceased. Curia New York's "Spill Prevention & Emergency Response Plan" (SPER Plan) identifies the methanol tanks (20T01 through 20T05) and their loading/unloading area as "Out of Service". The SPER Plan includes an inspection checklist in its Appendix J which will be completed before and after each use of the loading/unloading area for EWP excavation equipment decontamination. The inspection checklist is included in this EWP as Appendix D, and the completed checklists will be included in the EWP excavations report to NYSDEC.

The qualified environmental professional (QEP) will be responsible for ensuring that all outbound trucks will be swept clean if the tires, the outside of the dump box, the undercarriage, etc. come in contact with site soils before leaving the loading area. The QEP also will be responsible for ensuring that all outbound trucks will be washed at the truck wash, as necessary, before leaving the Site if the truck's tires, dump box, undercarriage, etc. come in contact with Site soils and cannot be cleaned by sweeping only. Wash waters will be collected and disposed of off-site in an appropriate manner. The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to Site derived materials. Material accumulated from the truck sweeping, street cleaning, and egress cleaning activities will be added to the excavation area soils awaiting offsite disposal at a permitted landfill in accordance with all applicable local, State, and Federal regulations.

5.0 MATERIALS TRANSPORT OFF-SITE

The following requirements have been established for all materials being transported off-site:

1. All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded. In addition to the Part 364 permit, all haulers will maintain appropriate shipping papers and/or waste manifests (6 NYCRR Part 372). Emergency response procedures and emergency telephone numbers

will be maintained in all vehicles, and operators will be trained in emergency response procedures.

2. Loaded vehicles will comply with load height and weight regulations.

3. Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

4. Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

5. The portion of all trucks which come into contact with potentially contaminated material will be washed prior to leaving the Site. Truck wash waters will be collected and disposed of off-Site in an appropriate manner.

6. ~~Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.~~ Truck traffic is prohibited through the nearby residential neighborhood. All truck traffic will utilize the NYS Route 9J Extension Truck Route and not enter residential neighborhood streets.

7. Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site excavation, remediation and development.

8. Queuing of trucks will be performed on-Site in order to minimize off-site disturbance. Off-site queuing will be prohibited. Idling while in the queue is subject to the limitations specified by 6NYCRR Part 217-3.

All trucks loaded with site materials will exit the vicinity of the site using only the truck route approved by Curia and NYSDEC (See Figure 4 for approved truck route). This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the Site; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

6.0 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations at the applicable location as deemed necessary per the characterization sampling. If disposal of material is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. It is anticipated that non-hazardous soil from the Site will be transported to the Colonie Landfill, pending an approved waste profile. The estimated breakdown of soil to be transported off-site will be provided in additional documentation for each Site activity.

Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Project Report. This documentation will include, but will not be limited to: waste profiles, test results, disposal facility acceptance letters, manifests, bills of lading and disposal facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted Soil Cleanup Objectives (SCOs) (6 NYCRR Part 375) is prohibited from being taken to a New York State Construction and Demolition (C&D) debris recovery facility (6 NYCRR Subpart 360-15 registered or permitted facility).

7.0 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed off-site at a permitted facility in accordance with applicable local, State, and Federal regulations, including but not limited to 6 NYCRR Part 360 Series, 6 NYCRR Part 370 Series, and NYSDEC Division of Materials Management Contained-In Determination Policy. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Pumping and collection of water will be done in a manner to prevent the migration of particulates or soil/fill, and to prevent damage to the existing subgrade materials. The collected water will be pumped and stored in drums or temporary storage totes (e.g. polyethylene totes wherever possible, if quantities deem it necessary) that are approved and labeled in accordance with United States Department of Transportation (USDOT), NYSDEC, and all other applicable requirements.

The water collected will be sampled on a minimum frequency of one representative sample per every ten drums or one sample per every 2,000 gallons of water collected in larger vessels. However, more frequent sampling may be directed by the NYSDEC or the disposal facility (e.g. a local publicly-owned treatment works (POTW)). It is anticipated that the water samples will be analyzed for TCL VOCs and TCL SVOCs, TCL PCBs, pesticides, herbicides, and Target Analyte List (TAL) metals.

Curia or their representative, will coordinate with NYSDEC Division of Materials Management prior to sampling to verify that the correct number of samples and parameter lists are being used as required by the Contained-In Determination process. Curia will verify the parameters with their selected disposal facility for characterization purposes.

Water from construction activities will not be discharged to surface waters or Site drains.

8.0 BACKFILL

All reused or imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d), (also tabulated in NYSDEC DER-10 Appendix 5), NYSDEC CP-51, and NYSDEC guidance values for PFAS and 1,4-dioxane.

8.1.1 On-Site Reuse

“Reuse on-Site” means reuse on-Site of material that originates from the project site and which does not leave the project area during the excavation. Excavated soil may be reused on-Site without restriction under an impervious cover such as asphalt or concrete, provided that it is free of gross contamination, is sampled at the frequency required in NYSDEC DER-10 Table 5.4(e)10 and meets the requirements of NYSDEC Part 375-6.7 (d), NYSDEC CP-51 and NYSDEC guidance values for PFAS and 1,4-dioxane.

Grossly contaminated media is defined by the NYSDEC as “soil, sediment, surface water or groundwater which contains sources of substantial quantities of mobile contamination in the form of NAPL that is identifiable either visually, through strong odor, by elevated contaminant vapor levels, or is otherwise readily detectable without laboratory analysis”. Grossly contaminated material will not be reused on-Site.

Modifications to the sampling and analysis requirements must be approved by the NYSDEC project manager.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. On-site reuse of demolition or concrete materials may require a site-specific beneficial use determination (BUD) obtained through the NYSDEC project manager. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

8.1.2 Off-Site Sources

All materials proposed for import will be approved by the qualified environmental professional and NYSDEC, as defined in 6 NYCRR Part 375. A Request to Import/Reuse Fill or Soil form will be prepared for each project as part of the EWP for NYSDEC review and approval. Material imported to Site will be hauled in trucks with tight fitting covers.

Material from industrial sites, spill sites, other environmental remediation sites, or potentially contaminated sites will not be imported to the site.

Soils that meet ‘general’ fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by NYSDEC project manager.

8.1.3 Sampling of Backfill

Soil material to be used as backfill will be sampled for the full suite of analytical parameters (identified below), including PFAS and 1, 4-dioxane. Solid waste will not be imported onto the site.

The following documentation will be submitted to the NYSDEC to demonstrate compliance with these requirements and with the NYSDEC's DER-10:

1. **General documentation for <u>all</u> sources of fill or soil being reused on-Site:**
    a. The name of the person providing the documentation and relationship to the source of the fill
    b. The location of where the fill is to be obtained
    c. Identification of any state or local approvals as a fill source
    d. A brief history of the use of the property for the proposed fill source
2. **Imported soil for use as backfill material:** Soil imported for use as backfill must be:
    a. Free of extraneous debris and solid waste.
    b. Be recognizable soil or other unregulated material as set forth in 6 NYCRR Part 360 and materials for which the NYSDEC has issued a beneficial use determination (BUD). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.
    c. Free of contaminant concentrations exceeding the lower of the NYSDEC's SCOs for the protection of groundwater and the SCOs for the protection of public health for commercial use as established in Table 375-6.8(b) of 6 NYCRR Subpart 375-6. NYSDEC CP-51 and NYSDEC guidance values for PFAS and 1,4-dioxane must also be met.

    Sampling is also required for all imported soils, with a minimum of one sample analyzed for every new source of material, at the following frequency:

    a. Soil or sand imported from a "virgin" mine or pit, at least one round of characterization samples for the initial 1,000 cubic yards of material imported in accordance with Table 4 below. For material designated as "virgin," written documentation shall be provided to the Site owner or owner's representative and the NYSDEC to document that the soil is native material from areas not having supported any known prior industrial or commercial development or agricultural use and is not now, nor has ever been, identified as a suspected depository for chemical, toxic, hazardous, or radioactive wastes.
    b. Material sources other than virgin mine/pit (e.g. a formerly developed site) must be sampled in accordance with the table below.

c. The sampling frequency can be reduced from those specified in the table below for projects involving large amounts of cover material and/or backfill, once a trend of compliance is established and the NYSDEC provides written authorization to reduce the sampling frequency.

Table 4: Sampling Frequency Requirements for Imported Soils

Analysis Required	VOCs	SVOCs, PCBs, Pesticides & Inorganics	
Soil Quantity (Cubic Yards)	Discrete Samples	Composite Samples	Requirements for Preparation of Composite Samples
0-50	1	1	Five (5) discrete samples from different locations within the fill being provided will comprise a composite sample for analysis. Additional requirements for composite sampling are described in Section 2.2.2 of the EWP.
50-100	2	1	
100-200	3	1	
200-300	4	1	
300-400	4	2	
400-500	5	2	
500-800	6	2	
800-1,000	7	2	
>1,000	Add an additional two (2) VOC grab samples and one (1) composite sample for each additional 1,000 cubic yards of material required, unless otherwise approved in writing by the NYSDEC.		

As indicated in Table 4, VOC analysis must be performed on discrete samples only, while all other testing parameters will be analyzed from composite samples. The testing frequency may be modified by the NYSDEC project manager in accordance with Section 1.6 of the NYSDEC's DER-10.

The following analyses will be performed on the backfill samples (virgin material or reuse):

- TCL VOCs by EPA Method 8260 (grab samples only)
- TCL SVOCs by EPA Method 8270
- Total PCBs by EPA Method 8082
- Pesticides by EPA Method 8081
- TAL metals and cyanide by EPA Methods 6010 and 7471
- Per-and polyfluoroalkyl substances by EPA Method 1633A (or most current updated approved method)
- 1,4-Dioxane by EPA Method 8270 selected ion monitoring (SIM)

The results of this chemical testing will be compared to the lower of the NYSDEC's SCOs for the protection of groundwater and protection of public health for commercial use as established in Table 375-6.8(b) of 6 NYCRR Subpart 375-6 as well as the supplemental soil cleanup objectives in the NYSDEC's *CP-51: Soil Cleanup* Guidance dated October 2010, NYSDEC Guidance

Values for PFAS and 1,4-dioxane, and/or any future pertinent soil cleanup guidance document. The source shall be rejected if any of these SCO's are exceeded.

3. **Non-soil Material Imported to the Site:** The following material may be imported without chemical testing, to be used as backfill beneath paved surfaces, buildings, or as part of the final soil cover layer, provided that it contains less than 10 percent by weight material which would pass through a size No. 100 sieve and consists of:

    a. Gravel, rock or stone, consisting of virgin material from a permitted mine or quarry; or

    b. Recycled concrete or brick from a NYSDEC registered construction and demolition debris processing facility if the material conforms to the requirements of Section 304 of the NYSDOT *Standard Specifications Construction and Materials - Volume 1 (2002).*

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

9.0 COVER SYSTEM

After the completion of soil removal and any other invasive activities, a demarcation barrier consisting of a non-woven geotextile will be placed in the excavation prior to backfill if materials have been imported from an off-site source. No demarcation barrier is necessary if utilizing on-Site soils for backfill. A cover system consisting of concrete or asphalt will be placed. Soil cover systems are not anticipated to be installed.

10.0 STORMWATER POLLUTION PREVENTION

Best management practices for stormwater pollution prevention will be followed for all projects. Projects larger than one-acre in size may be subject to additional requirements. Barriers and hay bale checks will be installed around any stockpiles (and open excavation, as needed) and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately. The inspection/repair records will be included in the Project Report submitted to the NYSDEC.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. There will be no discharge points from stockpiles. Catch basins will be protected with haybales or similar.

11.0 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project

manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within two hours to NYSDEC's Project Manager. Reportable quantities of petroleum product or other chemicals will also be reported to the NYSDEC Spills Hotline at 800-457-7362.

12.0 COMMUNITY AIR MONITORING PLAN

Community air monitoring will be performed during all intrusive activities and open-air waste soil handling in accordance with the NYSDOH *Generic Community Air Monitoring Plan* (CAMP), and Appendix 1A and 1B of DER-10. All air monitoring will be conducted on a real-time basis using both hand-held field instruments and perimeter air monitoring stations. All air monitoring readings will be recorded in a logbook and/or recorded by data loggers and will be provided to NYSDEC and NYSDOH (along with a sketch identifying the locations of the CAMP measurements/instrumentation coinciding with the CAMP data set) on a weekly basis, at a minimum, while ground-intrusive and soil handling activities are taking place. The air monitoring records will be included in the Project Report submitted to the NYSDEC. The CAMP developed for the Project consists of two primary components. The fugitive dust control plan and the vapor control plan. The presence of volatile organic compounds remaining at the Site necessitates the need for vapor monitoring while the presence of metals is the primary contaminant that necessitates the need for dust monitoring. Air monitoring will be conducted both upwind and downwind (1 station upwind and 1 station downwind) of the construction areas and will be compared to assess if the construction activities are causing potential airborne migration of contaminants. A Site-specific CAMP has been prepared for this project and is included in Appendix C.

A figure showing the prevailing wind directions is shown in Figure 5. It's anticipated that the monitoring stations will be placed in locations accordingly. The locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide one upwind and one downwind monitoring stations. Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers within one business day of the occurrence, as well as information on the duration of the exceedance and actions taken in response.

13.0 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis will include the following:

1. Limiting the area of open excavations and size of soil stockpiles.
2. Reducing the speed of excavation activities.
3. Shrouding open excavations with tarps and other covers.
4. Consider weather factors when planning daily activities (e.g. wind direction).
5. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include:
    a. Direct load-out of soils to trucks for off-site disposal.
    b. Covering stockpiles with poly-sheeting.
    c. Use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-Site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems, with approval from NYSDEC.

14.0 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the CAMP described in Section 12.0 and provided in Appendix C. If particulate levels at the site exceed the thresholds listed in the CAMP or if airborne dust is observed on the site or leaving the site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the site.

A dust suppression plan that addresses dust management during invasive on-Site work will include, at a minimum, the items listed below:

- When necessary, dust suppression will be achieved using fire hoses and/or garden hoses equipped with sprayers for this Project. All water utilized for dust control will be potable water from municipal water systems. The use of groundwater from the Site is not permitted.
- On-Site roadway usage will be limited in total area to minimize the area required for water truck sprinkling.

- Paved areas will be swept clean as needed, to reduce the potential for dust generation.
- Stockpiles and excavations will be covered with tarps and polyethylene sheets will be used to reduce the potential for dust generation.

15.0 GREEN AND SUSTAINABLE REMEDIATION

Curia, as a facility, participates in many greenhouse gas emission reduction strategies through their State Air Permit. In a good faith effort to minimize greenhouse gas emissions as part of routine maintenance and building expansions, the Summary of Green Remediation Metrics for Site Management form included in the June 2025 SMP Template (Appendix D) will be utilized for each project. Typical EWP green and sustainable practices will include utilizing NYSDEC Contained-In Determination processes as much as possible to minimize hazardous waste disposal , and utilizing local sources as much as possible for imported soils and disposal facilities.

16.0 REPORTING AND SCHEDULE

16.1 Project Reporting

A Project Report will be prepared and stamped by the New York State-licensed Professional Engineer responsible for the design and implementation of the projects performed in compliance with the EWP for each NYSDEC approved Change of Use notification. The Project Reports will be submitted to the NYSDEC within 90 days after completion of the ground-intrusive portion of the Site redevelopment and complete execution of waste manifests. At a minimum the report(s) will include:

- Figures depicting the approximate Site boundaries, the limits of the soil removal operations, and the limits of imported fill/soil placement;
- Copies of daily observation reports;
- A description of excavation activities conducted, health and safety monitoring (including Site-specific plans and CAMP), quantities and locations of soil excavated, characterization sample results for soil and/or groundwater to be disposed of off-site, disposal locations, manifests, and disposal receipts for the soil and/or groundwater, sampling locations and associated results, a description of problems encountered, location and acceptability of analytical results for backfill sources and other pertinent information necessary to document Site excavation activities were conducted properly;
- Completion of the Summary of Green Remediation Metrics for Site Management form (Appendix D)
- Submittal of sampling locations and laboratory results to NYSDEC's Equis environmental database; and

  A certification that on-Site work activities were conducted in conformance with the NYSDEC approved EWP.

FIGURES

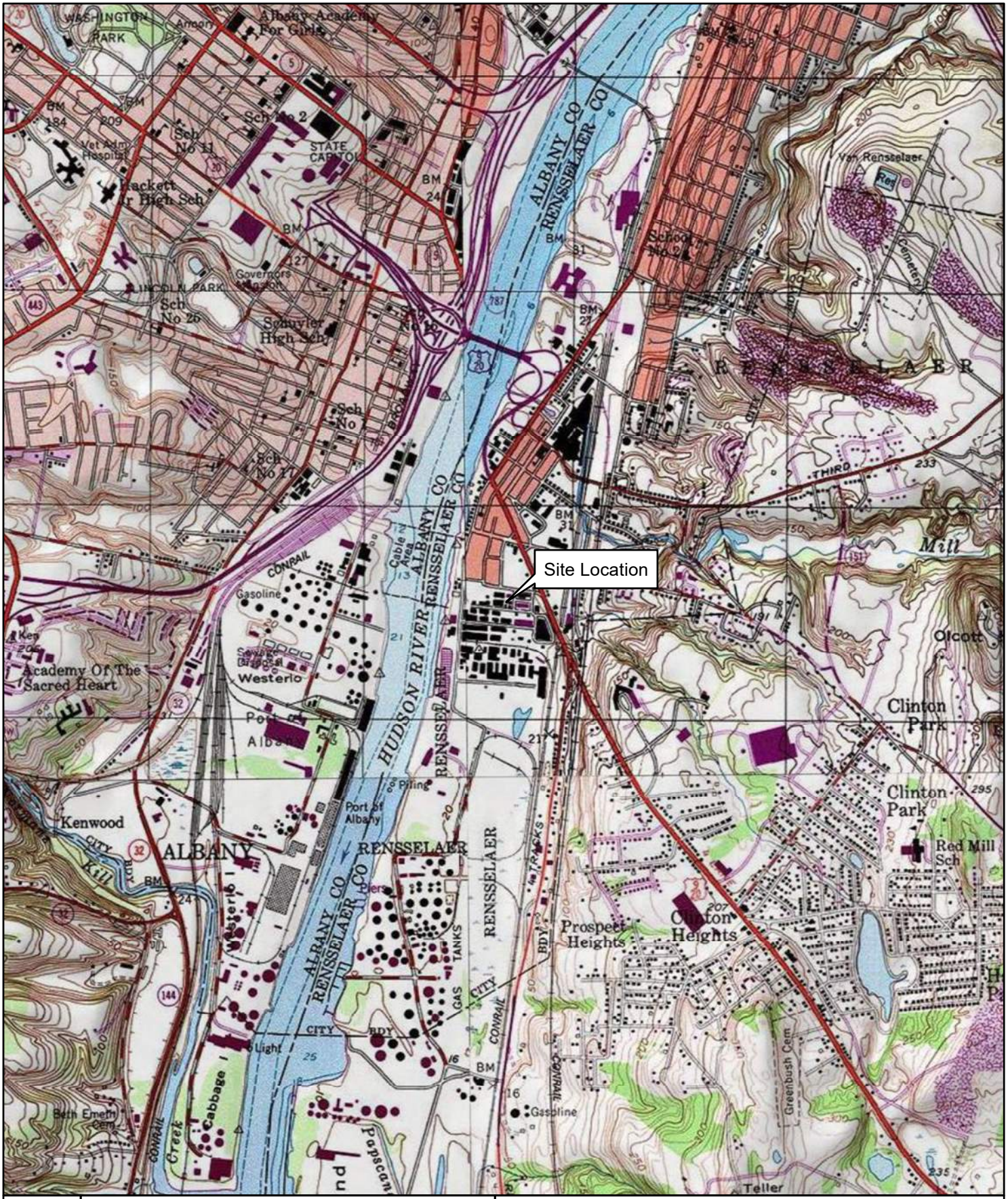


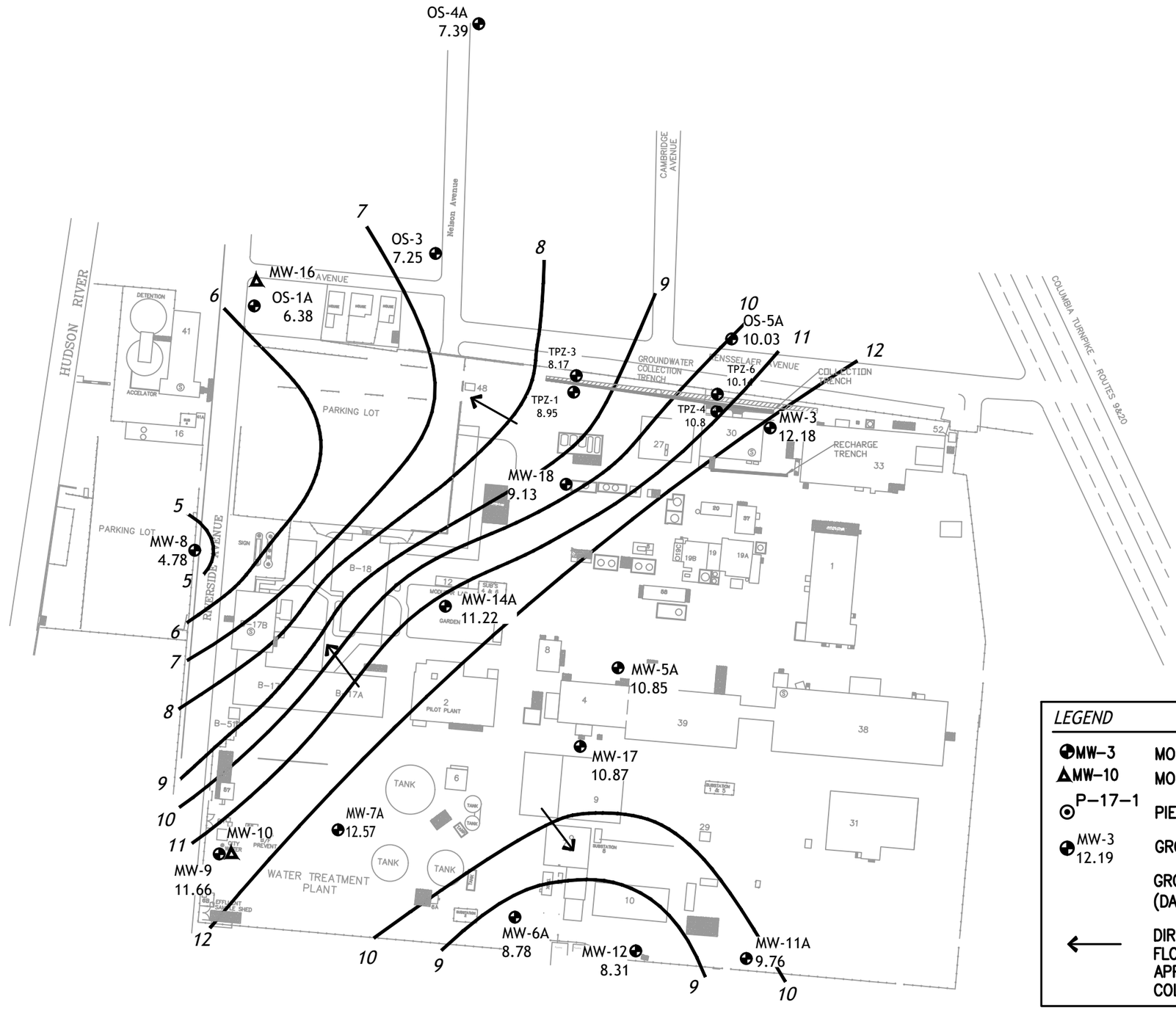
Figure 1 - Site Location Map

Sterling Drug Site 1, Site No. 442009
Curia New York
33 Riverside Avenue
City of Rensselaer, New Yrok

Scale 1" = 2000'

CHA Project No: 75104

Map Credits: Basemapping courtesy of the US Geological Survey Albany and South Troy USGS Quadrangles Date: 1994, 1980



0 160 320

Scale in feet

SOURCE: PLANT SITE MAP, DATED OCTOBER 27, 2009 BY SAIC

LEGEND

MW–3	MONITORING WELL LOCATION (SHALLOW)
MW–10	MONITORING WELL LOCATION (DEEP)
P–17–1	PIEZOMETER LOCATION
MW-3 12.19	GROUNDWATER ELEVATION (FT)
	GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
←	DIRECTION OF GROUNDWATER FLOW APPROX. LOCATION OF GROUNDWATER COLLECTION AND REINJECTION

CHA
III Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 . www.chasolutions.com

GROUNDWATER ELEVATION CONTOUR MAP
MONITORING DATE: OCTOBER 2025

CURIA NEW YORK, NYSDEC SITE NO. 442009
33 RIVERSIDE AVENUE
RENSSELAER, NEW YORK

PROJECT NO. 075104

DATE: 11/2025

FIGURE 2

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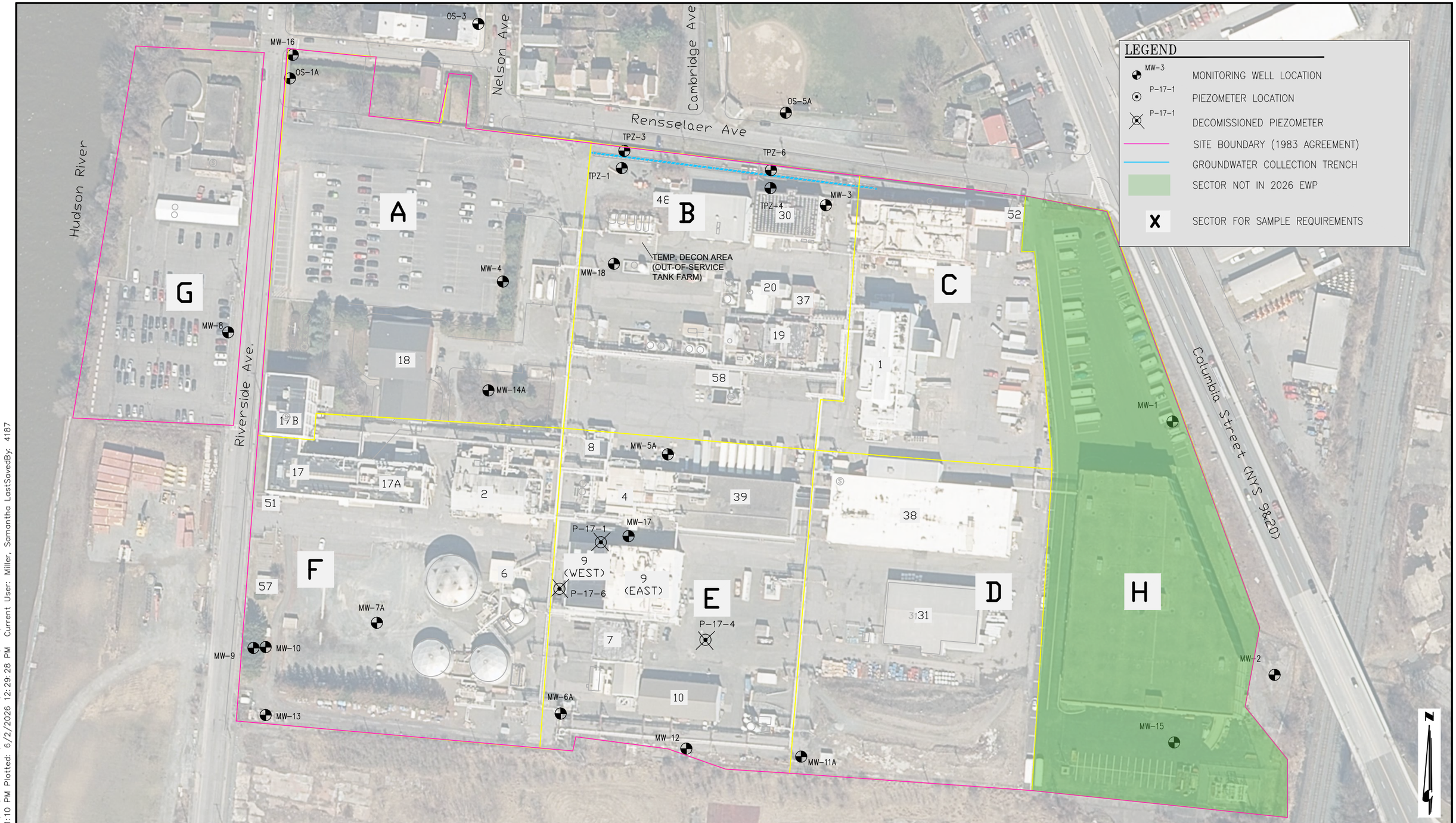
Saved: 11/25/2025 9:28:26 AM Plotted: 11/25/2025 9:29:17 AM User: Miller, Samantha LastSavedBy: 4187



CHA
III Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 . www.chacompanies.com

SITE AERIAL LAYOUT & PROJECT LOCATIONS

NYSDEC SITE NO. 442009
STERLING DRUG SITE 1 – CURIA NEW YORK
33 RIVERSIDE AVENUE, RENSSELAER, NEW YORK

PROJECT NO. 075104.001

DATE: 06/2026

FIGURE 3

File: V:\PROJECTS\ANY\K7\075104.001\09_DESIGN\DRAWINGS\ENV\EWP FIGURES.DWG
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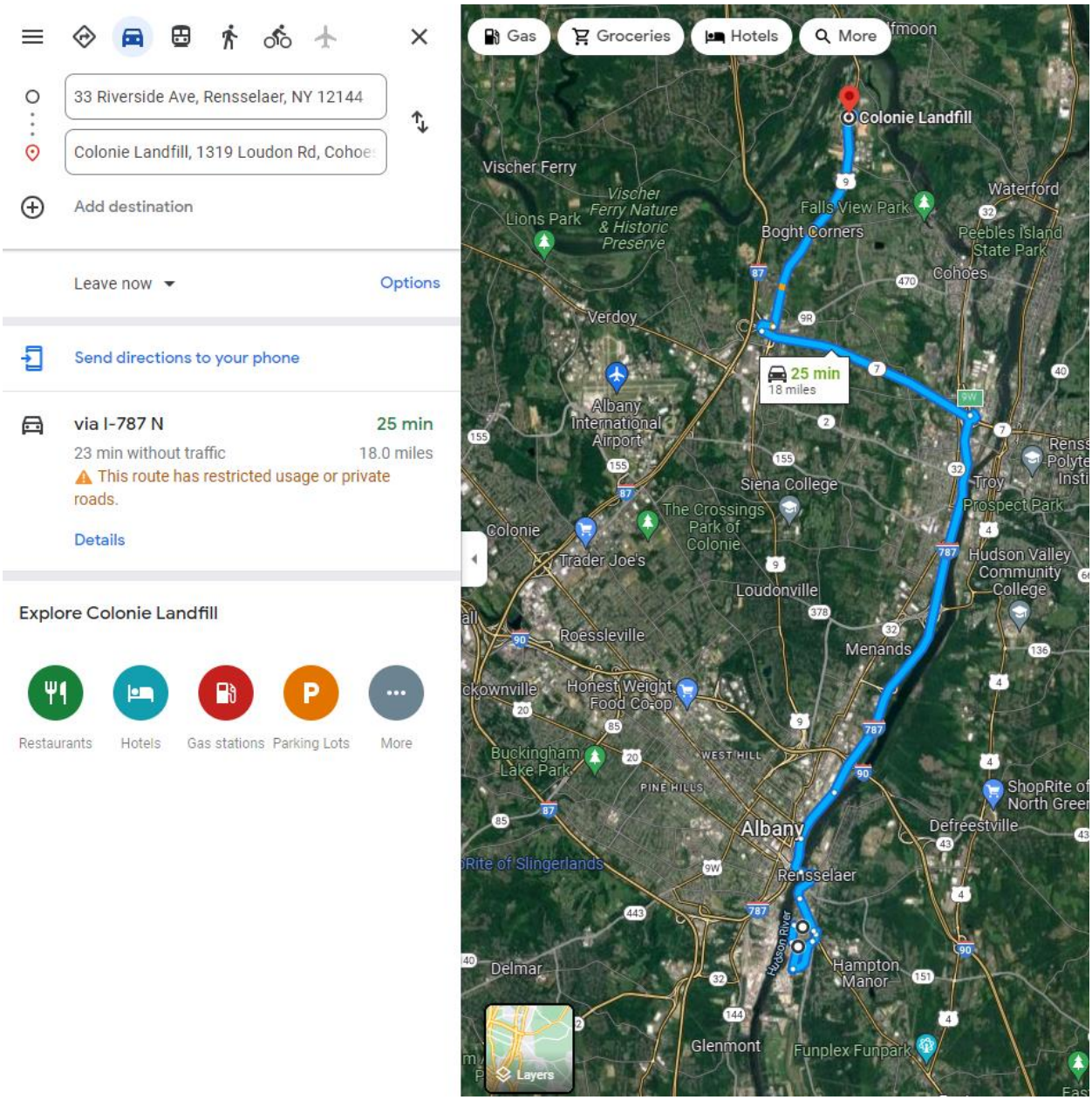
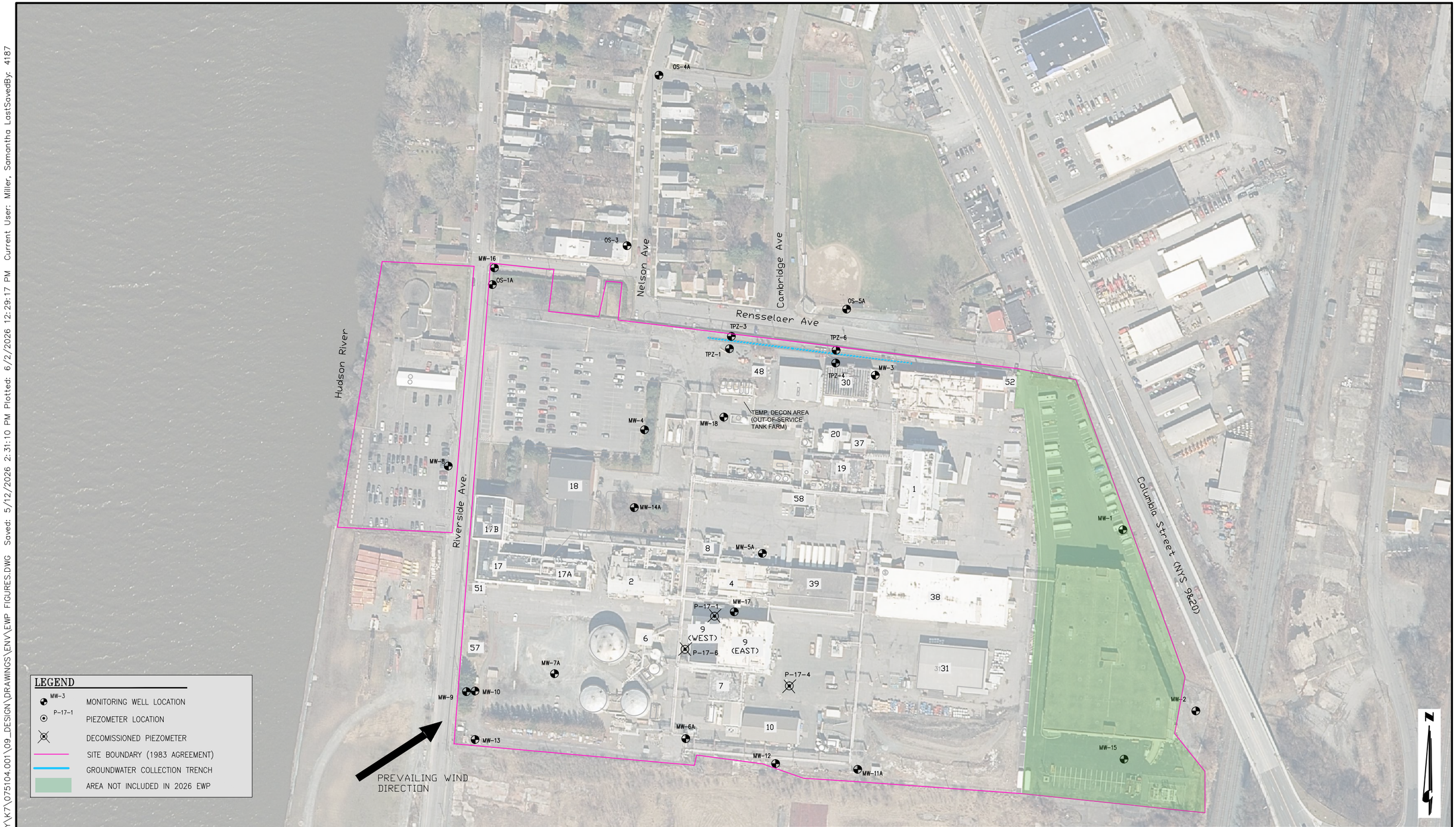
FIGURE 4 – TRUCK ROUTING MAP



TRUCK ROUTE DIRECTIONS

- Get on I-787 N in Albany from Riverside Ave, Irwin Stewart Port Expy, Columbia St and Dunn Memorial (7 min 3.3 mi)
- Follow I-787 N and NY-7 W to US-9 N in Colonie. Take the US-9 exit from NY-7 W (11 min 11.1 mi.)
- Follow US-9 N to your destination (6 min 3.7 mi.) 1319 Loudon road, Cohoes, NY 12047



LEGEND

- MW-3 — MONITORING WELL LOCATION
- P-17-1 — PIEZOMETER LOCATION
- DECOMISSIONED PIEZOMETER
- SITE BOUNDARY (1983 AGREEMENT)
- GROUNDWATER COLLECTION TRENCH
- AREA NOT INCLUDED IN 2026 EWP

0 175 350
Scale in feet

CHA
III Winners Circle, PO Box 5269
Albany, NY 12205-0269
518.453.4500 . www.chacompanies.com

PREVAILING WIND DIRECTION
NYSDEC SITE NO. 442009
STERLING DRUG SITE 1 – CURIA NEW YORK
33 RIVERSIDE AVENUE
RENSSELAER, NEW YORK

PROJECT NO. 075104.001

DATE: 06/2026

FIGURE 5

APPENDIX A

Health and Safety Plan

HEALTH AND SAFETY PLAN

Curia New York
Sterling Site 1
33 Riverside Avenue,
Rensselaer, New York

NYSDEC Inactive Hazardous Waste Site Number: 442009

CHA Project Number: 075104.001

October 2025
Revised: May 2026
June 2026

Prepared for:
Curia New York, Inc.
33 Riverside Avenue
Rensselaer, New York 12144

Prepared by:
CHA Consulting, Inc.
III Winners Circle
Albany, New York 12205
Phone: (518) 453-4500

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1.0 INTRODUCTION

The following Health and Safety Plan (HASP) has been created for the protection of CHA Consulting, Inc. (CHA) staff conducting the soil screening activities in accordance with the Excavation Work Plan (EWP), at the Curia New York, Inc. (Curia) Site located at 33 Riverside Avenue in the City of Rensselaer, Rensselaer County, New York (see Figure 1). The Curia Site is a New York State Department Environmental Conservation (NYSDEC) Inactive Hazardous Waste Disposal Site known as Sterling Drug Stie 1 with Site Number 442009. This project's various assignments require CHA employees to perform tasks where personal safety could be compromised due to chemical, physical, and/or biological hazards. While conducting field work, CHA employees may be exposed to chemical, physical, and/or biological hazards including but not limited to:

- Chemical exposure due to the presence of subsurface contamination in areas of excavated soils
- Slip/Trips/Falls
- Fire or ignition of flammable vapors in boring areas
- Excessive noise for certain operations (e.g. heavy equipment)
- Heavy equipment operation
- Environmental and Biological hazards (e.g. insects, plants, UV exposure, etc.)

The requirements and guidelines in this HASP are based on a review of available information and an evaluation of potential on-Site hazards, including:

- 1983 Interim Report: Phase I – Preliminary Site Investigations by Dames and Moore;
- 1984 Groundwater Containment and Collection System Design Report by Dames and Moore;
- 2000 Soil Vapor Extraction Pilot Test Report by SAIC;
- 2002 Soil Boring Program by SAIC;
- 2005 Final Construction Certification Report by SAIC;
- 2021 Biannual Groundwater Sampling and Analysis Report: October 2021 by CHA.

This HASP will be discussed with Site personnel and will be available on-Site for review while work is underway. CHA personnel will report to the Project Manager (PM) and consult with the Health and Safety Coordinator (HSC) in matters of health and safety. CHA Site personnel, PM, and HSC may consult with Curia's Environmental Health and Safety Department as well. The Site Safety Officer (SSO) and Field Team Leader (FTL) is the same person and is responsible for ensuring compliance with this HASP, stopping work when necessary, and for implementation of this HASP for daily Site activities.

Non-intrusive activities within CHA's Scope of work are those that do NOT have the potential to jeopardize the health and safety of Site workers, the public, or the environment with respect to Site contaminants. Intrusive activities within CHA's Scope of Work are those that have the

potential to cause health and safety concerns to Site workers, the public, or the environment. These activities and any non-intrusive activities conducted in an Exclusion Zone require training per 29 CFR 1910.120 on a NYSDEC hazardous waste site.

2.0 KEY PERSONNEL

2.1 Off-Site Personnel

Title: CHA Corporate Director of Health & Safety

Description: Responsible for the CHA's corporate health and safety program and developing procedures, policies, and coordinating training programs. Additionally, provides senior level guidance on development of HASPs and interpretation of regulations.

Contact:

Anthony Tremblay
(518) 302-9452 (Office)
(617) 908-7058 (Cell)

Title: Project Manager

Description: Reports to upper-level management, provides sufficient authority and resources to satisfy health and safety requirements, and assumes total control over Site activities. The Project Manager is ultimately responsible for ensuring field implementation of this HASP. The Project Manager may visit the Site from time to time to check status of fieldwork.

Contact:

Samantha Miller, P.E.
(315) 257-7154 (Office)
(915) 329-9898 (Cell)

Title: Project Engineer

Description: Guides the Project Manager in scientific, engineering, and remedial matters.

Contact:

Samantha Miller, P.E.
(315) 257-7154 (Office)
(915) 329-9898 (Cell)

Title: Scientific Advisor

Description: Guides the Project Team Leader in scientific matters, if project engineer is not available or a second opinion is needed.

Contact:

Keith Cowan, PG
(518) 453-2899 (Office)

(518) 466-8157 (Cell)

2.2 On-Site Personnel

Title: Field Team Leader

Description: Responsible for coordinating project requirements in the field. The Field Team Leader oversees daily activities of the project and is, therefore, responsible for implementing health and safety requirements and following safety procedures in the field. The Field Team Leader will contact the local emergency response organizations to notify concerned affiliates of the hazards associated with on-Site activity in accordance with the 2026 EWP.

Contact:

CHA Field Team Leader
(518) 453-4500 (Office)
Note: Specific CHA Field Team Leader to be determined. The selected individual's name and contact information will be communicated with the 5-day notification.

2.3 Optional On-Site Personnel

Title: Health and Safety Coordinator

Description: Responsible for making recommendations regarding the work area to the SSO. Inspections may be periodically conducted to monitor worker health and safety and will address such issues as appropriate personal proactive equipment (PPE), required air monitoring, decontamination procedures, and worker safety. The Health and Safety Coordinator is only expected to visit the site if higher levels of contamination are encountered requiring unusual mitigation or an accident occurs.

Contact:

Anthony Tremblay
(518) 302-9452 (Office)
(617) 908-7058 (Cell)

Title: Project Manager

Description: Reports to upper-level management, provides sufficient authority and resources to satisfy health and safety requirements, and assumes total control over Site activities. The Project Manager is ultimately responsible for ensuring field implementation of this HASP. The Project Manager may visit the Site from time to time to check status of fieldwork.

Contact:

Samantha Miller, P.E.
(315) 257-7154 (Office)
(915) 329-9898 (Cell)

2.4 As-Needed Personnel

Title: Fire Department
Description: Responds to fires and performs rescues.
Contact: 911
(518) 465-3259

Title: Ambulance
Description: Responds to medical emergencies.
Contact:
911
(518) 477-8243
Title: Police
Description: Responds to emergencies and performs rescues.
Contact:
911
(518) 462-7451
Title: EPA National Response Center
Description: Responds to all oil, chemical, radiological, biological and etiological discharges into the environment, anywhere in the United States and its territories.
Contact:
(800) 424-8802

2.5 Client-Specific Contacts

Title: Curia Environmental Health & Safety Officer
Description: Environmental Technician & WWTP Supervisor. Point of contact for onsite field work, responds to all on-Site spills, emergencies and compliance matters.
Contact:
Stephen Kelley
(518) 433-7700 (ext. 35325) (Office)

Title: Curia Senior EHS Manager
Description: Sr. EHS Manager
Contact:
Ed Leighton
(518) 433-7773 (Office)
(518) 788-0791 (Cell)

3.0 SITE ENTRY

3.1 Objectives

The objectives of the Site entry are to provide the following services, as needed/requested by Curia:

1. Screen excavated soils according to the EWP. Soil screening methods include visual, olfactory, and photoionic monitoring for levels of contamination in accordance with the the EWP.
2. Document the contractors' excavation activities

The intrusive Site activities may include the following:

1. Sampling of soil and groundwater for laboratory analysis during excavations and soil handling

3.2 Safety Meetings

To ensure that the HASP is being followed, the SSO shall conduct a safety meeting prior to entry to the Site or the initiation of any Site activity, if any conditions change, and before each workday. The attached Daily Jobsite Safety Brief Form should be utilized to document these daily jobsite briefings.

3.3 Safety Training

The SSO will confirm that every person assigned to a task has had adequate training for that task and that the training is up to date by checking with the CHA Safety Coordinator and online database. CHA staff working on-Site shall have a minimum of:

- 40-Hour Initial Hazardous Waste Operations and Emergency Response (HAZWOPER) training in accordance with 29 CFR 1910.120
- Current 8-hour HAZWOPER Refresher Training
- Field equipment safety training where applicable

All training will have been conducted and certified in accordance with OSHA regulations.
There is also site-specific health and safety training required by Curia for field personnel.

3.4 Medical Surveillance

All CHA personnel will have had a medical surveillance physical consistent with OSHA regulations and performed by a qualified occupational health physician if deemed necessary by project requirements. The SSO shall confirm prior to initiation of work on this Site that every CHA person assigned to a task has had an annual physical, has passed the medical examination, and has been determined medically fit by the occupational health physician for respirator use and this type of work if deemed necessary by the PM.

3.5 Site Mapping

Site mapping has been included in the Figures section of the HASP. Figure 1 illustrates the location of the subject Site. Directions and a map illustrating the route to the nearest hospital from the subject Site is provided in Appendix A of this HASP.

4.0 SITE CHARACTERIZATION

4.1 Site Description

The Site is approximately 26 acres and is located at 33 Riverside Avenue in the City of Rensselaer, New York. The Site is in an urban/industrial area and is an active pharmaceutical manufacturing facility. The Site has a long history of being used for manufacturing chemicals and pharmaceuticals by previous owners as well. There are currently 22 buildings on the Site, and it is zoned for industrial use. The Site is surrounded by a chain-link fencing with manned security gates that control access.

The Site includes the buildings and parking lot between Riverside Avenue and the Hudson River to the west of the main manufacturing plant area. A commercial storage building to the east between the main manufacturing plant area and NYS Route 9 & 20 is part of the Site as defined by the 1983 Agreement, but it was sold to a third-party decades ago. The Site is bounded by Rensselaer Avenue, private residences and a ball field to the north, and a vacant former industrial facility to the south.

Primary contaminants of concern (COCs) at the Site include benzene, chlorobenzene, 1,2-dichloroethane (1,2-DCA), and toluene. Groundwater monitoring has been conducted for over 30 years at the Site and first began circa October 1982, focusing on the COCs and limited metals analysis in select monitoring wells as consistent with the Agreement and Determination dated 1983 between Sterling Drug, Inc. and NYSDEC. Based on the data collected from the groundwater monitoring events, there are minimal detections of these contaminants across the Site, except for MW-3. The primary location of detections above groundwater standards is in and around MW-3, therefore in 2021 the list of evaluated parameters was expanded to include the full target compound list (TCL) VOCs.

Emerging contaminants 1,4-dioxane and per-and polyfluoroalkyl substances (PFAS) have been sampled at various locations and events since at least 2018 as part of a statewide initiative. A comprehensive evaluation of these contaminants is summarized in the Biannual Groundwater Sampling and Analysis Report (CHA April 2024). Regulation and guidance surrounding these contaminants continues to evolve, however it is important to note that there is not currently a regulation which requires remedial investigation into these contaminants at this time for this Site.

Because of the existing explosive potential of the ambient air at the Curia Site, on-site work requires the following precautions, unless a hot work permit is issued by appropriate Curia staff:

- Photos will only be taken using an intrinsically safe camera (to be provided by Curia).

- Cell phones may only be used inside a truck with windows and doors closed.
- Work areas will be monitored for lower explosive limit.

Appropriate personal protective equipment (PPE), as discussed in Section 10.0, is required for working anywhere within the Curia Site.

Alterations to this HASP and its PPE requirements may occur if ground-intrusive activities (e.g. soil screening activities) indicate higher levels of contamination are present than the previous investigations noted.

4.2 Neighboring Properties

The Site is bordered by the following:

- **North:** Rensselaer Avenue, and private residential houses. A residential area and a city park (Coyne Field) are beyond Rensselaer Avenue.
- **East: NYS Route 9 and 20, and commercial properties, plus a commercial building that is part of the Site as per the 1983 Agreement, but was sold many years ago so is not subject to this HASP.**
- **South:** Vacant former industrial facility
- **West:** Hudson River

4.3 Site Topography

The topography of the Site is relatively flat, with an elevation of approximately 17 to 19 feet above mean sea level. The Hudson River is approximately 300 feet to the west of the Site's main manufacturing area and flows southward (when the tide is falling). The groundwater movement for the main manufacturing area is generally northwestward for the northern portion and southward for the southern portion.

4.4 Meteorologic Data

Fieldwork is generally ongoing, with typical annual maintenance activities excavations beginning in May or June of each year, plus other excavations throughout the year as needed. The weather conditions can vary from cool to hot. Prior to each day's activities, the daily forecast should be monitored for indications of adverse work conditions. If poor weather hinders the continuation of the day's activities the Team Leader may notify the PM and stop work for the day.

5.0 HAZARD EVALUATION

Hazards are generally divided into three (3) categories, exposure to chemicals and hazardous materials, safety/physical hazards, and biological hazards. Safety/physical hazards are generally hazards such as electrical shock, slips/trips/falls, and confined spaces. Chemical hazards are further segregated by their routes of exposure that may cause adverse health effects. Biological hazards typically include plants, animals, and insects.

5.1 Chemical Hazards

Chemical	OSHA PEL	NIOSH REL	IDLH	Ionization Potential (IP)	Characteristics	Routes of Exposure	Symptoms of Exposure and Health Effects
Benzene	TWA 1 ppm ST 5 ppm	TWA 0.1 ppm ST 1 ppm	Ca 500 ppm	9.24 eV	Colorless to light-yellow liquid with an aromatic odor.	inhalation, skin absorption, ingestion, skin and/or eye contact	irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait, anorexia, lassitude, dermatitis, bone marrow depression; carcinogenic
Chloro-benzene	TWA 75 ppm	N/A	1000 ppm	9.07 eV	Colorless liquid with almond-like odor	inhalation, ingestion, skin and/or eye contact	irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animal: liver, lung, kidney injury
1,2-Dichloro-ethane	TWA 50 ppm C 100 ppm 200 ppm (5 minute maximum peak in any 3 hours)	Ca TWA 1 ppm ST 2 ppm	Ca 50 ppm	11.05 eV	Colorless liquid with a pleasant, chloroform-like odor	inhalation, ingestion, skin absorption, skin and/or eye contact	irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; carcinogen
Toluene	TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum)	TWA 100 ppm ST 150 ppm	500 ppm	8.82 eV	Colorless liquid with a sweet, pungent, benzene-like odor.	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, nose; lassitude (weakness, exhaustion); confusion, euphoria, dizziness headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage.
Arsenic	TWA 0.5 mg/m^3	N/A Ca	N/A	N/A	Appearance and odor vary depending upon the specific organic arsenic compound.	inhalation, ingestion, skin and/or eye contact	In animals: irritation skin, possible dermatitis; respiratory distress; diarrhea; kidney damage; muscle tremor, convulsions; possible gastrointestinal tract, reproductive effects possible liver damage; carcinogenic

Abbreviations:

Ca – Cancerous
C – Ceiling value
TWA – Time Weighted Average
IDLH – Immediately Dangerous to Life and Health
OSHA – Occupational Safety and Health Administration
PEL – Permissible Exposure Limit
NIOSH – National Institute for Occupational Safety and Health
REL – Recommended Exposure Limit
N/A – Not Available

5.2 Dispersion Pathways

The potential exposure mechanism that can transport particulates and VOCs from the areas of the intrusive Site activities to other areas of the Site as well as beyond the boundaries of the Site are:

- Contact with contaminated groundwater or soil,
- Projection of contaminated material in air,
- Conveyance in water runoff,
- Failure to adhere to decontamination procedures, and
- Failure to adhere to the Field Sampling Plan and/or Standard Operating Procedures.

Emissions can be a problem at any Site that involves intrusive activities and should be controlled to the extent feasible. To monitor VOC and particulate emissions during intrusive work, CHA will implement a Community Air Monitoring Plan (CAMP) in accordance with Section 6.0 below and the NYSDOH generic CAMP. In support of CAMP requirements, and to control VOC and particulate emissions in the work area, the following corrective actions can be implemented if emissions are produced:

- Minimizing the amount of exposed ground surface/covering exposed surfaces
- Lightly wetting surfaces
- Using chemical or foam dust suppressants (with authorization only)
- Maintain onsite speed limits (10 mph)

5.3 Physical Hazards

Physical hazards such as the following may be encountered on-Site:

- Explosive atmosphere
- Slip/Trip/Fall
- UV rays
- Lifting (generators, drums, equipment)
- Traffic – on access roadways at the facility
- Moving parts or equipment (including heavy construction equipment)

5.4 Biological Hazards

Biological hazards such as the following may be encountered on-Site:

- Ticks, mosquitoes, stinging insects, arachnids, chiggers
- Rodents, snakes, Hantavirus
- Physically damaging plants, poisonous plants

5.5 Hazard Identification and Control

Hazard controls generally consist of following specific safety procedures, training, engineering controls, air monitoring, and PPE selection. CHA employees are required to use the PPE appropriate to their work task and potential exposures as outlined in this HASP.

The levels of PPE assigned to each activity are based on available information on the estimation of exposure potential associated with each work task.

Affected Personnel	Task/Operation	Hazards	Hazard Control
All personnel	All field activities	Slips, trips, & falls	• Wear appropriate work boots. • Avoid slippery surfaces. • Remind field personnel to exercise good housekeeping practices • Be observant of activities around.
All personnel	All field activities	Physical injuries, such as abrasions or cuts	• Use safe work practices • Don proper PPE • Have a first aid kit readily available at Site
All personnel	Heavy lifting	Back injuries from lifting	• Practice safe lifting techniques. • Always use a minimum of 2 people for heavy lifts • Lift with legs
All personnel	All field activities	Fire (general)	• Identify location of fire extinguisher(s) – contractor sourced • Keep ignition sources away from flammable materials and atmospheres.
All personnel	All field activities	Noise Exposure	• Wear hearing protection if you must shout to hear someone who is standing one foot or less away.
All personnel	All field activities	Explosion Hazard	• Use cell phones only inside trucks with door closed (unless a hot work permit is issued). • Use intrinsically safe camera provided by Curia (unless a hot work permit is issued). • Use spark-proof tools, if available. • Monitor for Lower Explosive Limit (LEL)
All personnel	All field activities	Contact with heavy equipment and traffic	• Do not stand unnecessarily close to the heavy equipment/ drill rig when it is operating • Do not stand in lanes of traffic. Use cones or barricades to delineate work areas when work within access roads is required. • Wear a hard hat and high visibility clothing • Make eye contact with the operator/drivers
All personnel	All field activities	Security	• Stay alert to all on-Site activities • Report suspicious activities to PM and/or to Curia
All personnel	All field activities	Stinging insects (bees, hornets, wasps and yellow jackets)	• Do not agitate nests unless absolutely necessary. • Be aware of holes in the ground within the work area. • Avoid wearing bright or patterned clothing. • Avoid wearing/using scented items (e.g., perfume, cologne, soaps). • Inspect food and drinks prior to consumption.
All personnel	All field activities	Hantavirus	• Avoid dermal contact with rodent droppings. • Avoid inhalation of dust that is contaminated with rodent droppings.

Affected Personnel	Task/Operation	Hazards	Hazard Control
All personnel	All field activities	Mosquitos/West Nile Virus	• Eliminate mosquito breeding areas (standing water) at the work Site. • Apply insect repellent containing DEET to exposed, unbroken skin per the manufacturer's instructions. • Wear light colored clothing (pants, long sleeved shirts and socks).
All personnel	All field activities	Snakes	• Avoid actions which increase the risk of encountering a snake (e.g., overturning logs, rocks, etc.).
All personnel	All field activities	Rodents	• Avoid contact with rodents and burrowing animals.
All personnel	All field activities	Arachnids	• Avoid actions which increase the risk of encountering arachnids (e.g., overturning logs, placing hands in dark places).
All personnel	All field activities	UV Exposure	• Cover skin and limit time in sun to extent practical. • Apply sunscreen.

6.0 AIR MONITORING & ACTION LEVELS

6.1 Air Monitoring

The CAMP will be implemented during the intrusive activities at the Site. The purpose of the CAMP is to provide a measure of protection for the downwind community, including off-Site receptors such as residences and businesses and on-Site workers not directly involved with the excavation activities, from potential airborne contaminant releases as a result of excavation activities performed at the Site. The CAMP will be implemented following NYSDOH's Generic CAMP protocol with one upwind and one downwind air monitoring station. Refer to Section 12 of the 2026 EWP for additional details on the CAMP.

In support of the CAMP and to monitor air quality in the immediate work area, the following environmental monitoring instruments will be used within the Exclusion Zone:

- Lower Explosive Limit (LEL) Meter
- Photoionization Detector (PID) ppm range
- RKI GX-6000 meter (benzene specific)

The PID shall be used to detect volatile organic compounds in the ambient air in the work zone. An RKI-GX 6000 meter that is benzene specific will be used to detect benzene concentration levels in the ambient air in the work zone. The PID and RKI-GX 6000 meter will be rented from a reliable supplier (e.g., Eco-Rental Solutions) that pre-calibrates the meters before sending it into the field.

Contaminant/Method	Frequency	Action Level	SSO Action
CAMP Dust Meter	Continuous	150 ug/m^3 (15-minute average). If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be immediately confirmed. If the working Site particulate measurement is greater than 100 ug/m^3 corrective action is needed. If dust is observed leaving the working Site.	Additional dust suppression techniques should be deployed. See CAMP for additional details.
CAMP VOC Meter	Continuous	Downwind meter exceeds 5 ppm above background/upwind meter for the 15-minute period.	Stop work and notify PM. PM will notify Curia contact. Work may be resumed once source is identified and corrective actions taken. See CAMP for additional details.
LEL	Continuous	10% of LEL	Stop work and notify PM. PM will notify Curia contact.
Organic Vapors/ PID	Continuous	Total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5ppm over background/upwind levels. If organic vapor level is above 25 ppm at the perimeter of the work area, work activities must be shut down	Stop work and notify PM of elevated organic vapors. PM will notify Curia contact. Work may be resumed once source is identified and corrective actions taken. See CAMP for additional details.
Benzene Vapors/ RKI GX-6000 specific for benzene	At least twice hourly or as needed following any PID alert	0.05 ppm	Stop work and notify PM of elevated benzene vapors

Monitoring instrument calibration will be tested at the start of each full day of equipment usage or more frequently in accordance with manufacturer's recommendations.

6.2 Action Levels

Should action levels be reached, work operations shall cease until further evaluation is performed and safe levels are prevalent. If through engineering controls and monitoring, safe levels (below action levels) cannot be achieved, an upgrade in personal protection equipment shall be mandated by the SSO, or operations shall cease in that portion of the Site. The PM will be notified of any changes in PPE.

7.0 SITE CONTROL MEASURES

Exclusion Zone (EZ): Will include a 25-foot buffer around all boring areas and all areas where subsurface activities will occur. This will be delineated by cones/flagging or positioning field vehicles to block off the area.

Hazards within the EZ include excessive noise, slips/trips/falls, contact with heavy equipment, and hazards associated with proximity to boring activities; including direct contact with contaminated soil or water and inhalation of vapors from contamination.

Contamination Reduction Zone (CRZ): Will be established immediately adjacent to the Exclusion Zone and will be utilized for decontamination of personnel and small equipment (and large equipment as needed) donning and doffing of PPE. Whenever possible, the CRZ shall be placed upwind of the EZ. The CRZ will also be coned/flagged to prevent Site personnel from entering the area.

Hazards within the CRZ include contact with contaminated soil or water, inhalation of vapors from contamination, and slips/trips/falls. Physical hazards within the Site may pose a risk and good judgement should be utilized.

Support Zone: Will include all areas outside the EZ and CRZ.

Hazards within the support zone include slips/trips/falls and other physical hazards associated with chemical/industrial manufacturing operations.

7.1 Communication

Communication shall be accomplished by person to person verbal correspondence, the Curia-provided radio, and cell phones. **CELL PHONES CAN ONLY BE USED INSIDE THE WORK TRUCK WITH DOORS & WINDOWS CLOSED UNLESS A CURIA HOT WORK PERMIT IS ISSUED**. Communication procedures will be reviewed at the Safety Meeting before entering the work zone.

8.0 HAZARD COMMUNICATION

In compliance with 29 CFR 1910.1200, any hazardous materials brought on Site by any personnel (CHA or its sub-contractors) shall be accompanied with the material's Safety Data Sheet (SDS). The SSO shall be responsible for maintaining the SDSs on Site, reviewing them for hazards that working personnel may be exposed to, and evaluating their use on Site with respect to compatibility with other materials including personal protective equipment, and their hazards. Should the SSO deem the material too hazardous for use on the subject Site, the party responsible for bringing the material on Site will be required to remove it from the Site.

SDSs for typical materials CHA uses during work conducted under the EWP are included as Appendix B of this HASP. The EWP is for excavations related to annual maintenance activities and as needed for other excavations.

9.0 CONFINED SPACE

During work described in the EWP, which includes excavation related to annual maintenance activities and other excavations as needed, CHA personnel will not be permitted to enter any confined space. No confined space work is anticipated.

If a confined space entry becomes necessary, this HASP will be revised to outline all confined space entry procedures, techniques, and equipment to be consistent with OSHA regulations in 29 CFR 1910.146. Additionally, all entrants and attendants will be trained in Confined Space Awareness training consistent with 29 CFR 1910.146.

10.0 PERSONAL PROTECTIVE EQUIPMENT

At this time, Level A, B and C PPE are not expected to be needed. If Site conditions change and contamination is present at levels above the action level, this HASP will be updated to reflect greater protection of personnel. The following is a list of required PPE at this time.

Task/Operation	Level of PPE	Equipment
General Site observation at a distance greater than 25 feet from intrusive activities. • No drums present • No free product visible • 2-Minute Breathing Zone PID Readings < 5 ppm with the 11.7 eV bulb • No strong odors present	D	• Long pants (no shorts) • Shirts with long sleeves • Hard hat • Safety glasses • Reflective vests or yellow safety shirt • Work boots with safety toe • Hearing protection (if required) • Gloves (as appropriate)
Site Observation or Soil Screening Activities within the Exclusion Zone • No drums present • No free product visible • 2-Minute Breathing Zone PID Readings <5 ppm with the 11.7 eV bulb • Strong, pungent odors noted	D	• Same as above

11.0 DECONTAMINATION

Personnel working in the Exclusion Zone (within 25 feet of Site activities) will be required to enter and exit the work area through the Contamination Reduction Zone. Personnel engaged in decontamination will wear protective equipment including appropriate disposable clothing and respiratory protection and will also undergo decontamination procedures prior to leaving the decontamination area. The decontamination area will be placed upwind of the Exclusion Zone. The following equipment is needed for decontamination:

- Alconox
- Potable and distilled water
- Clean 5-gallon buckets
- Impermeable containers
- Polyethylene sheeting
- Garbage bags

The following list summarizes typical decontamination steps for personnel exiting the Exclusion Zone. Additional steps may be warranted based upon specific Site conditions.

Level D

- Remove any protective equipment.
- Discard disposable garments.
- Wash/rinse boots.
- Containerize wash and decontamination water for disposal.

Level C

- Will not be used at this time.

Level B

- Will not be used at this time.

Level A

- Will not be used at this time.

PPE will be decontaminated with soap (i.e. Alconox) and water. Expendable, non-reusable items will be disposed of in garbage bags and disposed off-site as solid waste. Heavily contaminated PPE will be containerized separate from soil and other wastes for offsite disposal.

Equipment and vehicles used by the Contractor in the Exclusion Zone to handle contaminated materials will be used in a manner to minimize contact with contaminated material. However, they will undergo decontamination procedures in the Contamination Reduction Zone prior to leaving each work area (i.e. each Exclusion Zone). The SSO will document that each piece of equipment has been decontaminated prior to removal from each work area. The decontamination procedures will include but are not limited to:

- Dry or damp brushing to remove visible contaminated material;
- Movement of equipment to the temporary decontamination pad;
- Removal of heavily-caked material with brushes or shovels; and
- Triple-rinsing with high pressure water or steam.

Small Equipment:

For soil sampling, dedicated sampling equipment is preferred. However, if non-dedicated equipment is used (i.e. stainless steel soil sampling equipment), the required decontamination procedure for all manual sampling equipment used to collect samples for chemical analysis is:

- Disassemble equipment, as required;
- Remove gross contamination from the equipment by brushing and then rinsing with tap water;
- Wash and scrub with low phosphate detergent (e.g. Alconox®);
- Tap water rinse;
- Distilled water rinse;
- Air dry.

All decontaminated equipment will be placed on or wrapped in polyethylene sheeting in order to avoid contacting a contaminated surface prior to use. Field personnel will use a new pair of outer gloves before handling sample equipment after it is cleaned. During periods of transportation and non-use, all decontaminated sampling equipment will be wrapped in polyethylene sheeting or aluminum foil. Refer to appropriate guidance regarding precautions when PFAS compounds are involved in the Site excavation activities because polyethylene sheeting and aluminum foil are not recommended for PFAS related sampling efforts.

Large Equipment:

CHA personnel are not responsible for the decontamination of large equipment; however CHA will oversee large equipment decontamination to verify thorough decontamination and proper

waste management occurs. Decontamination of heavy construction equipment will be performed by the contractor under the contractor's HASP.

While excavation and soil handling operations will be managed to avoid contact with soil by large equipment (other than excavator/loader buckets for example), a contingency plan for large equipment decontamination will include a temporary containment pad, sized appropriately for the equipment, within the existing out-of-service methanol tank farm CBS loading/unloading area. Any time the out-of-service methanol tank farm CBS loading/unloading area is utilized for decontamination purposes an inspection checklist must be reviewed and utilized. The checklist is included in the EWP as Appendix D.

12.0 EMERGENCY PROCEDURES

On-Site emergencies can range in intensity from minor to serious conditions. Various procedures for responding to Site emergencies are listed in this section. The designated SSO is responsible for contacting the CHA Project Manager who will notify the Curia representative in emergency situations (however, others must assume responsibility if the situation warrants). An injured person shall be accompanied by another worker at all times.

Should an on-Site emergency occur at the project Site (related to the project or otherwise) the following procedures shall be followed:

- Call the Curia WWTP Radio Channel for all emergency support. Curia has some onsite services and will call 911 for offsite emergency support as warranted.
- If the emergency occurs and is project specific, notify your Project Manager and assigned Health and Safety Coordinator to activate the appropriate actions.
- The PM will contact Curia personnel.
- The PM/Curia will also notify the NYSDEC Project Manager as soon as possible regarding emergencies or injuries.
- Properly trained personnel will determine if the emergency can be contained or remediated and initiate the appropriate action(s). Personnel shall not respond beyond their level of training.
- Employees are not to risk their health or life in taking aggressive action(s) to fight fire or stop releases. Only defensive actions shall occur until an action plan is resolved.
- Choose an exit route that provides fast, and safe, egress from the work area. The route taken should always be away from obvious obstructions or other hazardous conditions. Consult an evacuation map if you are unsure of where the nearest exit route is located.
- Do not delay evacuation to retrieve personal items or equipment.
- All persons shall exit areas in groups and attempt to stay together during evacuation procedures.
- While evacuating, notice any conditions which should be reported to emergency personnel. Be alert for the location of smoke, fire and/or vapors. Report any of these conditions to emergency personnel.

- Be aware of emergency response vehicles and avoid interference with these.

Remain calm, keep voices low and wait for instructions from the Incident Commander. Do not leave the scene prior to notifying your assigned Project Manager and Site Field Team Leader. An incident report form is included in Appendix C of this HASP.

13.0 EMERGENCY MEDICAL CARE

Call the Curia WWTP Radio Channel for all emergency support. Curia has some onsite services and will call 911 for offsite emergency support as warranted. 911 service is available and confirmed at this location. Only if 911 is unavailable or has a long lead time should someone be driven to the nearest medical facility.

Nearest hospital: Albany Memorial Hospital (directions and map are provided in Appendix A of this HASP)

Address: 600 Northern Boulevard,
Albany, New York 12204
Emergency Room Telephone Number: (518) 471-3111

Directions from Site:

1. Head north on Riverside Avenue/Broadway Avenue 0.4 mi.
2. Turn Left onto US-9/US-20 0.2 mi.
3. Bear Right onto US-20W/US-9N 0.5 mi.
4. Take ramp right for US-9 North toward Troy 1.2 mi.
5. Turn right onto Broadway 0.8 mi.
6. Turn Left onto Loudonville Rd. 0.5 mi.
7. Keep Left onto Shaker Rd./ CR-151 0.2 mi.
8. Hospital is on the right at 600 Northern Boulevard.
9. Follow signs to the Emergency Department

13.1 Emergency Notification Numbers

CHA Contact: Samantha Miller, P.E. (915) 329-9898 (Cell)

Curia Contact: Stephen Kelley via Curia Radio Channel WWTP

Fire Dept.: 911

Police Dept.: 911

Department of Emergency Services: 911

Poison Control: (800) 222-1222

13.2 On-Site First Aid

First aid kits will be available in the Support Zone (e.g. vehicles). General first aid procedures include:

Skin/Eye Contact: Flush eyes and/or skin thoroughly with water for 15 minutes. Remove contaminated clothing. If skin was contacted with a dry material, brush it off first, then flush with water. Seek medical attention if irritation develops.

Ingestion: Do not induce vomiting. Call Poison Control Center. Tell them what was swallowed, if possible. Follow instructions. Have SDS available for reference.

Inhalation: Remove person from contaminated environment without risking your own safety. **DO NOT ENTER A CONFINED SPACE. DO NOT ENTER EXCLUSION ZONE UNLESS WEARING ONE LEVEL HIGHER PROTECTION THAN VICTIM WAS WEARING.** Administer CPR, if necessary.

Injuries: Do not move a victim who may have a back injury. Cover them with coats, blankets, or other appropriate items to keep them warm. Personnel should immediately call the Curia WWTP Radio Channel for all emergency support. Curia has some onsite services and will call 911 for offsite emergency support as warranted.

Apply pressure to bleeding wounds. If the victim is able, have the victim apply pressure to the wound. If they are not able, wear gloves to protect from exposure to blood. Put gauze bandages or other clean cloth over the wound. Do not remove blood-soaked bandages or cloth - instead put additional bandages or cloths over the blood-soaked bandages. Elevate the limb with the injury above the heart.

Administer CPR if victim does not have a pulse and if you are currently certified in CPR. Have someone call for an ambulance immediately if there is any possibility that the victim is having or had a heart attack.

Shock is likely to develop in any serious injury or illness. The following are signals of shock: restlessness or irritability; altered consciousness; pale, cool, moist skin; rapid breathing; and/or rapid pulse. In the event of shock, do the following: Immediately have someone call for an ambulance; have the victim lie down; elevate legs 12 inches unless you suspect head, neck, or back injuries; if victim is cool, cover the victim to prevent chilling; do not give the victim anything to drink, even if thirsty.

14.0 CERTIFICATION

All Site personnel covered by this plan have read the HASP and are familiar with its contents and provisions.

Name	Title	Date

15.0 STANDARD OPERATING PROCEDURES

OSHA Quick Cards and applicable health and safety standard operating procedures are available in Appendix D of this HASP.

16.0 JOB HAZARD ANALYSIS

- ☐ Airport Safety
- ☐ Asbestos Abatement
- ☐ ATV-4 Wheeler
- ☐ Bridge Inspection
- ✓ **Cold Stress/Winter Weather**
- ☐ Confined Space
- ☐ Dogs
- ☐ Electrical Safety
- ✓ **Environmental Sampling/Outdoor Hazards**
- ✓ **Excavation**
- ✓ **Explosive atmosphere**
- ☐ Exposure to Electrical Transmission Lines
- ☐ Hand-Power Tools
- ✓ **Heat Stress**
- ✓ **Heavy Equipment**
- ✓ **Noise**
- ☐ Pressurized Cans
- ☐ Rail Safety
- ✓ **Slips, Trips, Falls**
- ✓ **Working In-Around Traffic**
- ☐ Working Over Water
- ☐ Working With Ladders
- ✓ **Biological Hazards**

DAILY JOBSITE SAFETY BRIEF

PROJECT INFORMATION			
Project Name:		**CHA Project No.**	
Project Start Date:	**Completion Date:**	**Weather:**	
Project Location:		**Project Task:**	
		Complete a Site Health & Safety Plan per Task	
Description of Work:			
Be Specific:			
Key Personnel:			
Responsibilities:	*Project Manager*	*Field Team Leader*	*Site Safety Officer*
Description of Hazards:			

The Daily Jobsite Safety Brief must be completed before work begins daily or Scope of Work changes

Weather: _____

All staff have reviewed and signed site and safety plan ☐Yes ☐No	All staff have proper PPE ☐Yes ☐No
Hazards and precautions have been discussed ☐Yes ☐No	Safety Controls in place ☐Yes ☐No

Additional Notes/Comments: _____

_____

_____

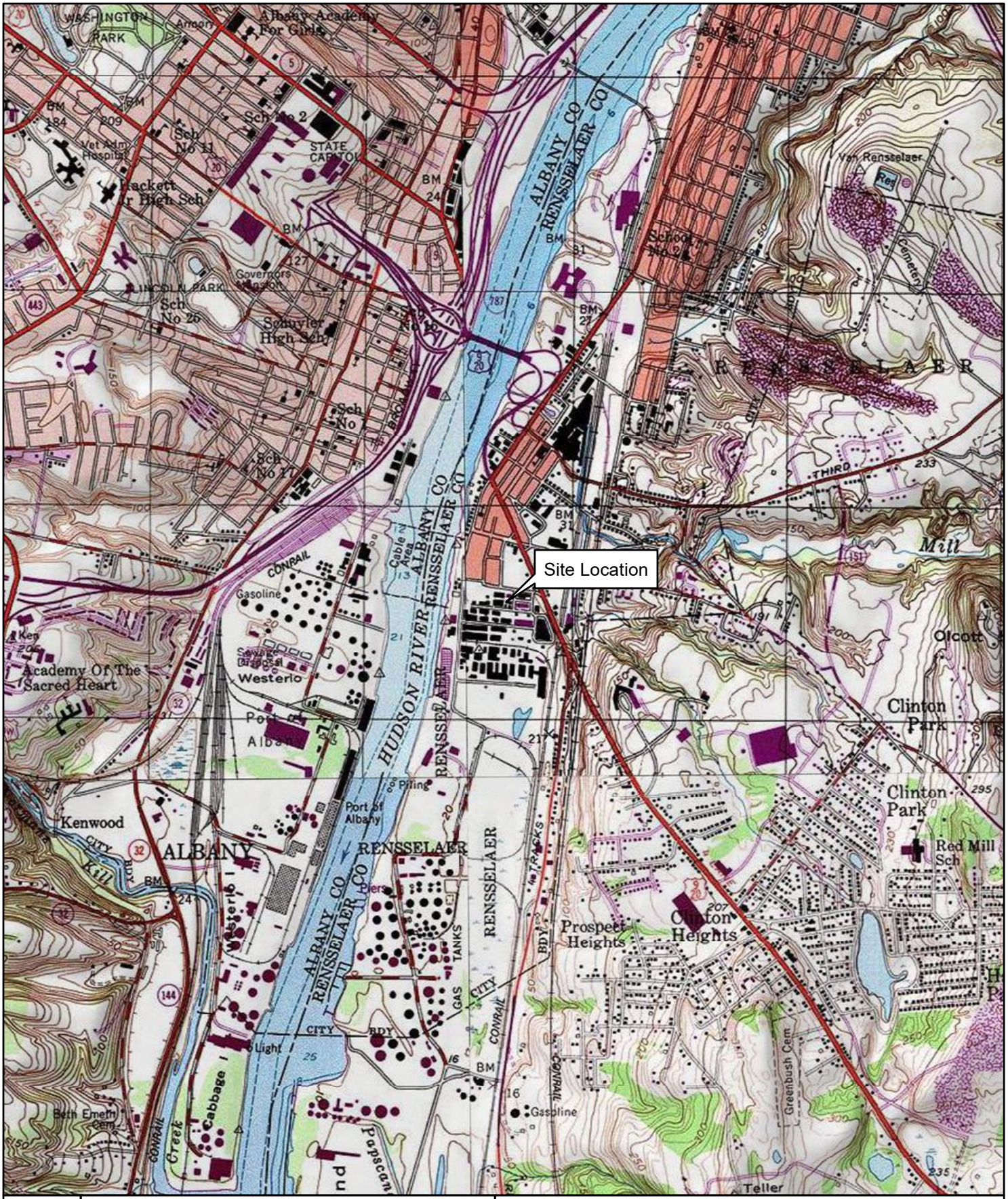
_____

Signed: _____ **Date/Time:** _____

Signed: _____ **Date/Time:** _____

Signed: _____ **Date/Time:** _____

HASP - FIGURES



N	CHA	**Figure 1 - Site Location Map** *Sterling Drug Site 1, Site No. 442009* *33 Riverside Avenue* *City of Rensselaer, New Yrok*
Scale 1" = 2000'	**CHA Project No: 21341**	***Map Credits: Basemapping courtesy of the US Geological Survey Albany and South Troy USGS Quadrangles Date: 1994, 1980***

HASP - APPENDIX A

Hospital Directions and Map

bing maps

A Curia **33 Riverside Ave, Rensselaer, NY 12144**

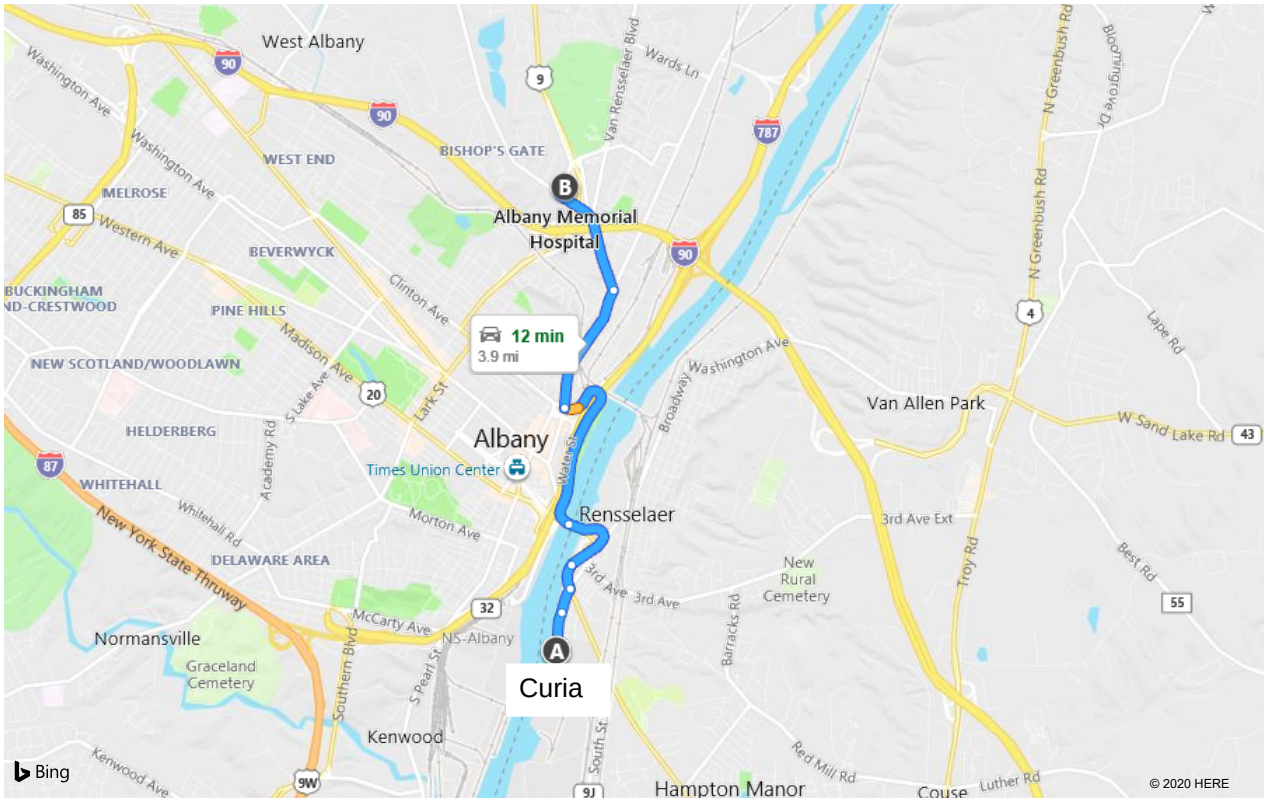
B **Albany Memorial Hospital, 600 Northern Blvd, Albany, NY 12204**

12 min , 3.9 miles
Light traffic
Via Riverside Ave, Broadway
· Local roads

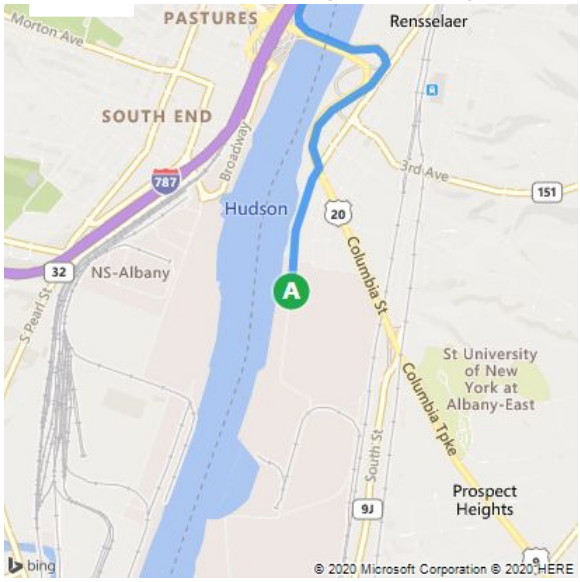
A Curia

↑	1.	Head **north** on **Riverside Ave** toward Belmore Pl	0.2 mi
↑	2.	Road name changes to **Broadway**	0.2 mi
↰	3.	Turn **left** onto **US-9 / US-20**	0.2 mi
↗	4.	Bear **right** onto **US-20 W / US-9 N**	0.5 mi
↱	5.	Take ramp **right** for **US-9 North** toward **Troy**	1.2 mi
↱	6.	Turn **right** onto **Broadway**	0.8 mi
↰	7.	Turn **left** onto **Loudonville Rd**	0.5 mi
↑	8.	Keep **left** onto **Shaker Rd / CR-151**	0.2 mi
↱	9.	Turn **right** • *Private Road*	325 ft
	10.	Arrive The last intersection is Shaker Rd / CR-151	

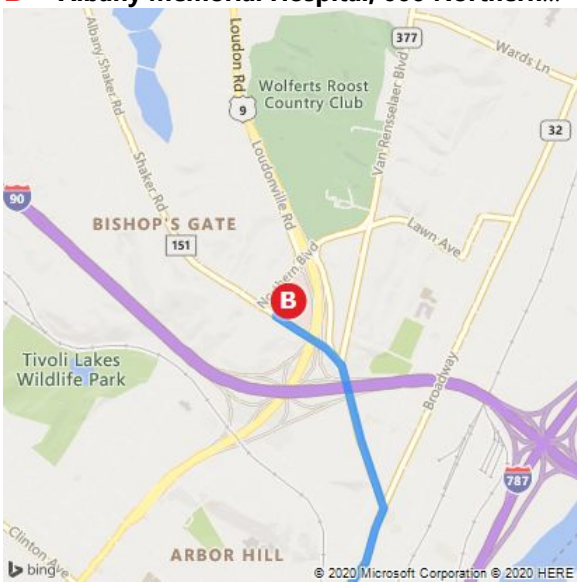
B Albany Memorial Hospital



A Curia **33 Riverside Ave, Rensselaer, NY 12...**



B **Albany Memorial Hospital, 600 Northern...**



HASP - APPENDIX B

Safety Data Sheets

FLINN SCIENTIFIC, INC.
Safety Data Sheet (SDS)

SDS #: 246.00
Revision Date: June 5, 2014

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Alconox® Cleaner

Flinn Scientific, Inc. P.O. Box 219, Batavia, IL 60510 (800) 452-1261
CHEMTREC Emergency Phone Number: (800) 424-9300

Signal Word **WARNING**

Pictograms

SECTION 2 — HAZARDS IDENTIFICATION

Hazard class: Skin and serious eye damage, corrosion or irritation (Category 2, 2A). Causes skin and serious eye irritation (H315+H319).

SECTION 3 — COMPOSITION, INFORMATION ON INGREDIENTS

Component Name	CAS Number	Formula	Formula Weight	Concentration
Proprietary mixture manufactured by Alconox, Inc.	None established	Proprietary	Proprietary	

SECTION 4 — FIRST AID MEASURES

Call a POISON CENTER or physician if you feel unwell.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing (P305+P351+P338). **If eye irritation persists:** Get medical advice or attention (P337+P313).
If on skin: Wash with plenty of water (P302+P352). **If skin irritation occurs:** Get medical advice or attention (P332+P313).
If swallowed: Rinse mouth. Call a POISON CENTER or physician if you feel unwell.

SECTION 5 — FIRE FIGHTING MEASURES

Nonflammable, noncombustible solid.
When heated to decomposition, may emit toxic fumes.
In case of fire: Use a tri-class dry chemical fire extinguisher.

NFPA CODE
None established

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Sweep up the spill, place in a sealed bag or container, and dispose. Ventilate area and wash spill site after material pickup is complete. See Sections 8 and 13 for further information.

SECTION 7 — HANDLING AND STORAGE

Flinn Suggested Chemical Storage Pattern: Inorganic Miscellaneous, or near washing area.

SECTION 8 — EXPOSURE CONTROLS, PERSONAL PROTECTION

Wear protective gloves, protective clothing, and eye protection (P280). Wash hands thoroughly after handling (P264).

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

White to cream-colored flakes or powder. Slight chlorine odor.
Alconox is a trade name. Anionic detergent. No other details available from the manufacturer.
Soluble: Water

SECTION 10 — STABILITY AND REACTIVITY

Avoid strong acids and oxidizing agents.
Shelf life: Indefinite if kept dry.

SECTION 11 — TOXICOLOGICAL INFORMATION

Acute effects: Irritant.
Chronic effects: N.A.
Target organs: N.A.

ORL-RAT LD_{50}: N.A.
IHL-RAT LC_{50}: N.A.
SKN-RBT LD_{50}: N.A.

N.A. = Not available, not all health aspects of this substance have been fully investigated.

SECTION 12 — ECOLOGICAL INFORMATION

Data not yet available.

SECTION 13 — DISPOSAL CONSIDERATIONS

Please review all federal, state and local regulations that may apply before proceeding.
Flinn Suggested Disposal Method #26b is one option.
Material is completely biodegradable.

SECTION 14 — TRANSPORT INFORMATION

Shipping name: Not regulated. Hazard class: N/A. UN number: N/A.

N/A = Not applicable

SECTION 15 — REGULATORY INFORMATION

Not listed.

SECTION 16 — OTHER INFORMATION

Consult your copy of the *Flinn Science Catalog/Reference Manual* for additional information about laboratory chemicals.

Revision Date: June 5, 2014

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades

MSDS No. 9950

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43^{o}C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

Isobutylene (0.0005% - 1.34%), Oxygen (19.5 - 23.5%) in balance Nitrogen

Safety Data Sheet 50054

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 03/24/2015 Version: 1.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture

Product name : Isobutylene (0.0005% - 1.34%), Oxygen (19.5 - 23.5%) in balance Nitrogen

Replaces ISC MSDS No. : 1810-2939, 1810-4216I, 1810-4547, 1810-4554, 1810-4562, 1810-4570, 1810-4950, 1810-5809, 1810-6591, 1810-7292, 1810-7375, 1810-9407

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Test gas/Calibration gas.

1.3. Details of the supplier of the safety data sheet

U.S. Supplier: Industrial Scientific Corporation
1 Life Way
Pittsburgh, PA 15205-7500
Phone (412) 788-4353
TOLL-FREE 800-DETECTS
Fax (412) 788-8353

MANUFACTURER: CALGAZ
821 Chesapeake Drive
Cambridge, MD 21613

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300
Internationally: 1-703-527-3887

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Compressed gas H280

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS04

Signal word (GHS-US) : Warning

Hazard statements (GHS-US) : H280 - Contains gas under pressure; may explode if heated

Precautionary statements (GHS-US) : P202 - Do not handle until all safety precautions have been read and understood
P271 - Use only outdoors or in a well-ventilated area
P403 - Store in a well-ventilated place
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG21 - Open valve slowly

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Nitrogen	(CAS No) 7727-37-9	75.16 - 80.4995	Compressed gas, H280
Oxygen	(CAS No) 7782-44-7	19.5 - 23.5	Ox. Gas 1, H270 Compressed gas, H280
Isobutylene	(CAS No) 115-11-7	0.0005 - 1.34	Flam. Gas 1, H220 Liquefied gas, H280

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Adverse effects not expected from this product. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Adverse effects not expected from this product.

First-aid measures after skin contact : Adverse effects not expected from this product.

First-aid measures after eye contact : Adverse effects not expected from this product.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Adverse effects not expected from this product.

Symptoms/injuries after skin contact : Adverse effects not expected from this product.

Symptoms/injuries after eye contact : Adverse effects not expected from this product.

Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

4.3. Indication of any immediate medical attention and special treatment needed

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Fire hazard : The product is not flammable.

Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity : None known.

5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.

Protection during firefighting : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

Specific methods : Exposure to fire may cause containers to rupture/explode. Continue water spray from protected position until container stays cool. Move containers away from the fire area if this can be done without risk.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.

Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.

Emergency procedures : Evacuate and limit access. Ventilate area.

6.2. Environmental precautions

Try to stop release if safe to do so.

6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if safe to do so.

Methods for cleaning up : Dispose of this material and its container in accordance with local regulations.

6.4. Reference to other sections

See also Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure.

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.

Safe handling of the gas receptacle : Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Safe use of the product : The substance must be handled in accordance with good industrial hygiene and safety procedures. Only experienced and properly instructed persons should handle gases under pressure. Consider pressure relief device(s) in gas installations. Ensure the complete gas system was (or is regularily) checked for leaks before use. Do not remove or deface labels provided by the supplier for the identification of the cylinder contents. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.

Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : None known.

Storage conditions : Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area.

Incompatible products : None known.

Incompatible materials : Flammable materials.

Storage area : Store away from heat. Store in a well-ventilated place.

7.3. Specific end use(s)

See Section 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Isobutylene (0.0005% - 1.34%), Oxygen (19.5 - 23.5%) in balance Nitrogen	
ACGIH	Not applicable
OSHA	Not applicable

Isobutylene (115-11-7)		
ACGIH	ACGIH TWA (ppm)	250 ppm
OSHA	Not applicable	

Oxygen (7782-44-7)	
ACGIH	Not applicable

Oxygen (7782-44-7)	
OSHA	Not applicable

Nitrogen (7727-37-9)	
ACGIH	Not applicable
OSHA	Not applicable

8.2. Exposure controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities. Ensure exposure is below occupational exposure limits.

Hand protection : Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection.

Eye protection : Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.

Skin and body protection : Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.

Respiratory protection : None necessary during normal and routine operations. See Sections 5 & 6.

Thermal hazard protection : None necessary during normal and routine operations.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

Other information : Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Appearance : Clear, colorless gas.

Color : Colorless

Odor : Coal gas Odorless

Odor threshold : No data available

pH : Not applicable for gas-mixtures.

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable for gas-mixtures.

Flammability (solid, gas) : See Sect. 2.1 & 2.2

Explosion limits : Not applicable - not flammable

Explosive properties : Not applicable - not flammable.

Oxidizing properties : Supports combustion. Not combustible but enhances combustion of other substances.

Vapor pressure : Not applicable.

Relative density : No data available

Relative vapor density at 20 °C : No data available

Molecular mass : Not applicable for gas-mixtures.

Relative gas density : Lighter or similar to air.

Solubility : Water: Solubility in water of component(s) of the mixture :
• : Insoluble • : 39 mg/l • : 20 mg/l

Log Pow : Not applicable for gas-mixtures.

Log Kow : Not applicable for gas-mixtures.

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Viscosity : No data available

Viscosity, kinematic : Not applicable.

Viscosity, dynamic : Not applicable.

9.2. Other information

Additional information : None.

SECTION 10: Stability and reactivity

10.1. Reactivity

None known.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Can form explosive mixtures with flammable materials.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

Flammable materials.

10.6. Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Isobutylene (115-11-7)	
LC50 inhalation rat (mg/l)	620 mg/l/4h
LC50 inhalation rat (ppm)	239620.46 ppm/4h
ATE US (gases)	271823.000 ppmV/4h
ATE US (vapors)	620.000 mg/l/4h
ATE US (dust, mist)	620.000 mg/l/4h

Oxygen (7782-44-7)	
LC50 inhalation rat (ppm)	800000 ppm/4h

Nitrogen (7727-37-9)	
LC50 inhalation rat (ppm)	820000 ppm/4h

Skin corrosion/irritation : Not classified
pH: Not applicable for gas-mixtures.

Serious eye damage/irritation : Not classified
pH: Not applicable for gas-mixtures.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Isobutylene (115-11-7)	
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Symptoms/injuries after inhalation : Adverse effects not expected from this product.

Symptoms/injuries after skin contact : Adverse effects not expected from this product.

Symptoms/injuries after eye contact : Adverse effects not expected from this product.

Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/injuries upon intravenous administration : Not known.

Chronic symptoms : Adverse effects not expected from this product.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Isobutylene (0.0005% - 1.34%), Oxygen (19.5 - 23.5%) in balance Nitrogen	
Persistence and degradability	No data available.

Isobutylene (115-11-7)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

Oxygen (7782-44-7)	
Persistence and degradability	No ecological damage caused by this product.

Nitrogen (7727-37-9)	
Persistence and degradability	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Isobutylene (0.0005% - 1.34%), Oxygen (19.5 - 23.5%) in balance Nitrogen	
Log Pow	Not applicable for gas-mixtures.
Log Kow	Not applicable for gas-mixtures.
Bioaccumulative potential	No data available.

Isobutylene (115-11-7)	
Log Pow	2.35
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

Oxygen (7782-44-7)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

Nitrogen (7727-37-9)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Isobutylene (0.0005% - 1.34%), Oxygen (19.5 - 23.5%) in balance Nitrogen	
Mobility in soil	No data available.

Isobutylene (115-11-7)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Oxygen (7782-44-7)	
Ecology - soil	No ecological damage caused by this product.

Nitrogen (7727-37-9)	
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Effect on ozone layer : None.

Effect on the global warming : No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.

Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1956 Compressed gas, n.o.s.

UN-No.(DOT) : UN1956

Proper Shipping Name (DOT) : Compressed gas, n.o.s.

Hazard labels (DOT) : 2.2 - Non-flammable gas

DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;305

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Packaging Exceptions (49 CFR 173.xxx) : 306;307

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 75 kg

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg

DOT Vessel Stowage Location : A - The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel.

Additional information

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

ADR

Transport document description : UN 1956 COMPRESSED GAS, N.O.S., 2.2

Class (ADR) : 2 - Gases

Hazard labels (ADR) : 2.2 - Non-flammable compressed gas

Transport by sea

UN-No. (IMDG) : 1956

Proper Shipping Name (IMDG) : COMPRESSED GAS, N.O.S.

Class (IMDG) : 2.2 - Non-flammable, non-toxic gases

Air transport

UN-No.(IATA) : 1956

Proper Shipping Name (IATA) : COMPRESSED GAS, N.O.S.

Class (IATA) : 2

SECTION 15: Regulatory information

15.1. US Federal regulations

Isobutylene (115-11-7)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Oxygen (7782-44-7)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Nitrogen (7727-37-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

Isobutylene (115-11-7)
Listed on the Canadian DSL (Domestic Sustances List)

Oxygen (7782-44-7)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas Class C - Oxidizing Material

Nitrogen (7727-37-9)	
Listed on the Canadian DSL (Domestic Sustances List)	
WHMIS Classification	Class A - Compressed Gas

EU-Regulations

Isobutylene (115-11-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Oxygen (7782-44-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Nitrogen (7727-37-9)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Classification according to Regulation (EC) No. 1272/2008 [CLP]
Not classified

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]
No additional information available

National regulations

Isobutylene (115-11-7)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Oxygen (7782-44-7)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Nitrogen (7727-37-9)
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15.3. US State regulations

Isobutylene (115-11-7)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Oxygen (7782-44-7)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Nitrogen (7727-37-9)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.

Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
Ox. Gas 1	Oxidizing gases Category 1
H220	Extremely flammable gas
H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated

SDS US (GHS HazCom 2012)

This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this gas mixture. To the best of Calgaz's knowledge, the information contained herein is reliable and accurate as of this date; however, accruacy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Safety Data Sheet

Material Name: Hess 10W30 Motor Oil

SDS No. 8957
US GHS

Synonyms: Valvoline Product Code 52670413

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Skin Corrosion/Irritation – Category 2
Specific Target Organ Toxicity – Category 3 (narcosis)
Carcinogenicity - Category 1B

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

WARNING

Hazard Statements

Causes skin irritation.
May cause cancer.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Wash hands and forearms thoroughly after handling.
Wear protective gloves/protective clothing/eye protection.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.

Response

If on skin: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep in a position comfortable for breathing. Call poison center or doctor if you feel unwell.

Storage

Store locked up.
Store in a well-ventilated place.
Keep container tightly closed.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
64742-65-0	Petroleum distillates, solvent dewaxed heavy paraffinic	83-93

Petroleum-based lubricating oil with detergent/dispersant engine oil package with zinc compounds.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If symptoms develop, move individual away from exposure and into fresh air. Flush eyes gently with water while holding eyelids apart. If symptoms persist or there is visual difficulty, seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

First Aid: Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

First Aid: Notes to Physician

Acute aspiration of large amounts of oil-laden material may produce a serious aspiration hazard. Patients who aspirate these oils should be followed for the development of long-term sequelae. Repeated aspiration of mineral oil can produce chronic inflammation of the lungs (i.e. lipoid pneumonia) that may progress to pulmonary fibrosis. Symptoms are often subtle and radiological changes appear worse than clinical abnormalities. Occasionally, persistent cough, irritation of the upper respiratory tract, shortness of breath with exertion, fever, and bloody sputum occur. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities. Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.
Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively. No special fire hazards are known to be associated with this product. Dense smoke may be generated while burning.

Hazardous Combustion Products

May form: carbon dioxide and carbon monoxide, oxides of sulfur, nitrogen and phosphorous, various hydrocarbons.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

SMALL SPILL: Absorb liquid on vermiculite, floor absorbent or other absorbent material. Persons not wearing proper personal protective equipment should be excluded from area of spill.

LARGE SPILL: Prevent run-off to sewers, streams, or other bodies of water. If run-off occurs, notify authorities as required, that a spill has occurred. Persons not wearing proper personal protective equipment should be excluded from area of spill until clean-up has been completed.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Avoid contact with: acids, halogens, strong oxidizing agents.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

ACGIH, OSHA, and NIOSH have not developed exposure limits for any of this product's components.

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Not normally required. However, wear resistant gloves such as nitrile rubber to prevent irritation which may result from prolonged or repeated skin contact with product.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

To prevent repeated or prolonged skin contact, wear impervious clothing and boots. Wear normal work clothing covering arms and legs.

Hygiene Measures

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Dry, clear and bright	**Odor:**	None
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	ND	**Vapor Density:**	ND
Boiling Point:	>425 °F (218.3°C) @ 760.00 mmHg	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.881 @ 60°F (16°C)
Evaporation Rate:	Slower than ethyl ether	**VOC:**	ND
Viscosity:	<= 3300.0 cps @ -20°C; 10.0 - 11.0 cst @ 100°C	**Octanol/H2O Coeff.:**	ND
Flash Point:	430 °F (221.1 °C)	**Flash Point Method:**	COC
Upper Flammability Limit (UFL):	ND	**Lower Flammability Limit (LFL):**	ND
Burning Rate:	ND	**Auto Ignition:**	ND

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

None

Incompatible Products

Avoid contact with: acids, halogens, strong oxidizing agents.

Hazardous Decomposition Products

May form: aldehydes, carbon dioxide and carbon monoxide, hydrogen sulfide, oxides of sulfur, nitrogen and phosphorus, toxic fumes, various hydrocarbons.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if large amounts are swallowed.

B: Component Analysis - LD50/LC50

Petroleum distillates, solvent dewaxed heavy paraffinic (64742-65-0)

Inhalation LC50 Rat >4.7 mg/L 4 h; Oral LD50 Rat >5000 mg/kg; Dermal LD50 Rabbit >5000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

May cause mild skin irritation. Prolonged or repeated contact may dry the skin. Symptoms include redness, burning, drying and cracking of the skin, and skin burns. Additional symptoms of skin contact include: acne. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

May cause mild eye irritation. Symptoms include stinging, tearing, and redness.

Potential Health Effects: Ingestion

Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

Potential Health Effects: Inhalation

It is possible to breathe this material under certain conditions of handling and use (for example, during heating, spraying, or stirring). Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms usually occur at air concentrations higher than the recommended exposure limits.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects.

Carcinogenicity

A: General Product Information

May cause cancer.

Used motor oil has been shown to cause skin cancer in laboratory animal continually exposed by repeated applications.

B: Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Acute aspiration of large amounts of oil-laden material may produce a serious aspiration hazard.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Petroleum distillates, solvent dewaxed heavy paraffinic (64742-65-0)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	>5000 mg/L
48 Hr EC50 Daphnia magna	>1000 mg/L

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

Shipping Name: Not Regulated

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	--	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

ZINC C1-C14 ALKYLDITHIOPHOSPHATE (CAS No. 68649-42-3)

State Regulations

Component Analysis - State

None of this product's components are listed on the state lists from CA, MA, MN, NJ, PA, or RI.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Petroleum distillates, solvent dewaxed heavy paraffinic	64742-65-0	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	1
Reactivity	0

HMIS® Hazard Rating

Health	1*	Slight
Fire	1	Slight
Physical	0	Minimal
		*Chronic

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

NewellRubbermaid Brands That Matter | Office Products Group

MATERIAL SAFETY DATA SHEET MSDS # 3000

Section One: Identification

Newell Rubbermaid, Inc. (Sanford L.P.)
2707 Butterfield Road
Oak Brook, IL 60523 USA
800-323-0749 or 630-481-2000

EMERGENCY MEDICAL NUMBER:
888-786-0972

Product Name: Sharpie Fine Point Marker, Sharpie Ultra Fine Point Marker, Sharpie Extra Fine Marker, Sharpie Chisel Tip Marker, Sharpie Twin Tip Marker, Super Sharpie Marker, Super Sharpie Twin Tip Marker, Sharpie Mini Fine Point Marker, Sharpie Micro Marker, Sharpie Grip Marker, Sharpie Retractable Fine Point Marker, Sharpie Magnum Marker, Sharpie King Size Marker, Sharpie Liquid Tip Marker.

Colors: All Colors

NewellRubbermaid, Inc (Sanford L.P.) is a member of The Art and Creative Materials Institute, Inc. This product is certified by the Institute to be labeled in accordance with the voluntary chronic hazard labeling standard ASTM D-4236 and is labeled with the AP Non Toxic Seal. Products bearing the AP Approved Product Seal of The Art and Creative Materials Institute, Inc. are certified in a program of toxicological evaluation by a medical expert, subject to review by the Institute Toxicology Advisory Board, to contain no materials in sufficient quantities to be toxic or injurious to humans, or to cause acute toxicity or chronic health problems.

Section Two: Hazard Identification

Not Hazardous under normal use conditions. Not for use on skin. Do not ingest. Contact with eyes may cause irritation.

Section Three: Composition

Dyes
Pigments
Solvent Mixture: Butanol (71-36-3), Propanol (71-23-8), Diacetone Alcohol (123-42-2), Ethanol (64-17-5)

Section Four: First Aid Measures

Inhalation: Remove source of irritation. If symptoms persist seek medical attention

Skin Contact: Wash with soap and water. If irritation persists seek medical attention.

Eye Contact: Rinse eyes with water, if irritation persists seek medical attention.

Ingestion: If symptoms occur seek medical attention.

Section Five: Fire Fighting Measures

Flash Point: N/A

Extinguishing Media: As appropriate for surrounding area.

Special Fire Fighting Measures: N/A

Hazardous combustion products: N/A

Section Six: Accidental Release Measures

In Case of Spill or Accidental Release: Wipe up with absorbent material.

Section Seven: Handling and Storage

Handling: Do not shake marker.

Storage: Keep cap on marker when not in use.

Section Eight: Exposure Controls and Personal Protection

Eye Protection: None under normal use conditions.

Clothing: None under normal use conditions.

Respirator: None under normal use conditions.

Section Nine: Physical and Chemical Properties

Boiling Point:	N/A
Specific Gravity:	N/A
Vapor Pressure:	N/A
Solubility in Water:	N/A
Evaporation Rate:	N/A
Appearance/Odor:	Marker/Alcohol (ink)

Section Ten: Stability and Reactivity

Stability:	N/A
Conditions to Avoid:	Avoid exposure to heat, flame or other sources of ignition.
Chemical Incompatibility:	N/A
Hazardous Polymerization:	N/A.

Section Eleven: Toxicological Information

See Section Two: Hazard Identification for any hazards

Section Twelve: Ecological Information

Not available

Section Thirteen: Disposal Considerations

Dispose of in accordance with all Federal, State, and Local Regulations.

Section Fourteen: Transport Information

DOT:	Not available
IATA:	Not available
IMO:	Not available

Section Fifteen: Regulatory Information

United States:	All components in this product are listed on or exempt from reporting under the Federal Toxic Substances Control Act (TSCA).

Section Sixteen: Other Information

HMIS Code	
Health	N/A
Flammability	N/A
Reactivity	N/A
Personal Protection	N/A

0=Minimal / 4 = Severe

NewellRubbermaid, Inc has been advised by Counsel that the OSHA Hazard Communication Standard and the Health Canada Workplace Hazardous Materials Information Standard do not apply to the Sanford Product described in this Material Safety Data Sheet. The reasons for the exemptions are contained in 29 CFR 1910.1200(b)(6)(ix) as amended Sept 14, 2009 per the Code of Federal Regulations and also Canadian Hazardous Products Act part 12 section (f) as amended June 1, 2009. The information contained in this MSDS is forwarded to you for your information, but is not meant to imply that the product is covered by nor is this MSDS meant to comply with all requirements of the hazard communication standards.

Safety Data Sheet

RUST-OLEUM CORPORATION
* Trusted Quality Since 1921 *
www.rustoleum.com

1. Identification

Product Name: ICWB LSPR 12PK FLUORESCENT ORANGE MARKNG

Revision Date: 8/7/2018

Product Identifier: 203036

Supercedes Date: 3/14/2018

Recommended Use: Marking Paint/Alkyd

Supplier:
Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Rust-Oleum Canada (ROCA)
200 Confederation Parkway
Concord, ON L4K 4T8
Canada
Emergency Phone: 800-387-3625

Manufacturer:
Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Preparer: Regulatory Department

Emergency Telephone: 24 Hour Hotline: 847-367-7700

2. Hazard Identification

Classification

Symbol(s) of Product

Signal Word
Danger

Possible Hazards
29% of the mixture consists of ingredient(s) of unknown acute toxicity.

GHS HAZARD STATEMENTS

Flammable Aerosol, category 1	H222	Extremely flammable aerosol.
Compressed Gas	H280	Contains gas under pressure; may explode if heated.
Carcinogenicity, category 2	H351	Suspected of causing cancer.
STOT, repeated exposure, category 2	H373	May cause damage to organs through prolonged or repeated exposure.

GHS LABEL PRECAUTIONARY STATEMENTS

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P410+P412	Protect from sunlight. Do not expose to temperatures exceeding 50°C / 122°F.
P410+P403	Protect from sunlight. Store in a well-ventilated place.
P201	Obtain special instructions before use.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local, regional and national regulations.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P314	Get medical advice/attention if you feel unwell.

3. Composition / Information On Ingredients

HAZARDOUS SUBSTANCES

Chemical Name	CAS-No.	Wt.%	GHS Symbols	GHS Statements
Propane	74-98-6	17	GHS04	H280
n-Butane	106-97-8	8.0	GHS04	H280
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	6.7	GHS08	H304
Hydrotreated Light Distillate	64742-47-8	5.3	GHS08	H304
Xylenes (o-, m-, p- isomers)	1330-20-7	4.4	GHS02-GHS07	H226-315-319-332
Ethylbenzene	100-41-4	1.1	GHS02-GHS07-GHS08	H225-304-332-351-373
Stoddard Solvent	8052-41-3	0.7	GHS08	H304-372
Pigment Orange 13	3520-72-7	0.2	Not Available	Not Available
Crystalline Silica / Quartz	14808-60-7	0.1	Not Available	Not Available

4. First-Aid Measures

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

FIRST AID - SKIN CONTACT: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Do NOT use mouth-to-mouth resuscitation. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

FIRST AID - INGESTION: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. Get immediate medical attention. If swallowed, get medical attention.

5. Fire-Fighting Measures

EXTINGUISHING MEDIA: Alcohol Film Forming Foam, Carbon Dioxide, Dry Chemical, Dry Sand, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLASH POINT IS LESS THAN 20°F. EXTREMELY FLAMMABLE LIQUID AND VAPOR!Water spray may be ineffective. Closed containers may explode when exposed to extreme heat due to buildup of steam. Closed containers may explode when exposed to extreme heat. Vapors may form explosive mixtures with air. Vapors can travel to a source of ignition and flash back. Isolate from heat, electrical equipment, sparks and open flame. Perforation of the pressurized container may cause bursting of the can. No unusual fire or explosion hazards noted. Keep containers tightly closed.

SPECIAL FIREFIGHTING PROCEDURES: Full protective equipment including self-contained breathing apparatus should be used. Evacuate area and fight fire from a safe distance. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

Special Fire and Explosion Hazard (Combustible Dust): No Information

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled liquid with sand or earth. DO NOT use combustible materials such as sawdust. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools. Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers. Ventilate area, isolate spilled material, and remove with inert absorbent. Dispose of contaminated absorbent, container, and unused contents in accordance with local, state, and federal regulations.

7. Handling and Storage

HANDLING: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and launder before reuse. Use only with adequate ventilation. Follow all SDS and label precautions even after container is emptied because it may retain product residues. Avoid breathing fumes, vapors, or mist. Avoid contact with eyes, skin and clothing.

STORAGE: Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Contents under pressure. Do not store above 120 ° F. Store large quantities in buildings designed and protected for storage of flammable aerosols. Product should be stored in tightly sealed containers and protected from heat, moisture, and foreign materials. Store in a dry, well ventilated place. Keep container tightly closed when not in use. Keep away from heat, sparks, flame and sources of ignition. Avoid excess heat.

Advice on Safe Handling of Combustible Dust: No Information

8. Exposure Controls / Personal Protection

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Propane	74-98-6	20.0	N.E.	N.E.	1000 ppm	N.E.
n-Butane	106-97-8	10.0	N.E.	1000 ppm	N.E.	N.E.
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	10.0	N.E.	N.E.	N.E.	N.E.
Hydrotreated Light Distillate	64742-47-8	10.0	N.E.	N.E.	N.E.	N.E.
Xylenes (o-, m-, p- isomers)	1330-20-7	5.0	100 ppm	150 ppm	100 ppm	N.E.
Ethylbenzene	100-41-4	5.0	20 ppm	N.E.	100 ppm	N.E.
Stoddard Solvent	8052-41-3	1.0	100 ppm	N.E.	500 ppm	N.E.
Pigment Orange 13	3520-72-7	1.0	N.E.	N.E.	N.E.	N.E.
Crystalline Silica / Quartz	14808-60-7	1.0	0.025 mg/m3	N.E.	50 µg/m3	N.E.

PERSONAL PROTECTION

ENGINEERING CONTROLS: Use explosion-proof ventilation equipment. Provide general dilution of local exhaust ventilation in volume and pattern to keep TLV of hazardous ingredients below acceptable limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. A NIOSH/MSHA approved air purifying respirator with organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

SKIN PROTECTION: Use gloves to prevent prolonged skin contact. Nitrile or Neoprene gloves may afford adequate skin protection.

EYE PROTECTION: Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT: Refer to safety supervisor or industrial hygienist for further guidance regarding types of personal protective equipment and their applications.

HYGIENIC PRACTICES: Wash thoroughly with soap and water before eating, drinking or smoking. Remove contaminated clothing immediately and launder before reuse.

Engineering Measures for Combustible Dust: No Information

9. Physical and Chemical Properties

Appearance:	Aerosolized Mist	**Physical State:**	Liquid
Odor:	Solvent Like	**Odor Threshold:**	N.E.
Relative Density:	0.844	**pH:**	N.D.
Freeze Point, °C:	N.D.	**Viscosity:**	N.D.
Solubility in Water:	Miscible	**Partition Coefficient, n-octanol/water:**	N.D.
Decompostion Temp., °C:	N.D.		
Boiling Range, °C:	-37 - 537	**Explosive Limits, vol%:**	0.9 - 12.6
Flammability:	Supports Combustion	**Flash Point, °C:**	-104
Evaporation Rate:	Faster than Ether	**Auto-ignition Temp., °C:**	N.D.
Vapor Density:	Heavier than Air	**Vapor Pressure:**	N.D.

(See "Other information" Section for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Avoid temperatures above 120°F (49°C). Avoid all possible sources of ignition.

INCOMPATIBILITY: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

HAZARDOUS DECOMPOSITION: By open flame, carbon monoxide and carbon dioxide. When heated to decomposition, it emits acrid smoke and irritating fumes. Contains solvents which may form carbon monoxide, carbon dioxide, and formaldehyde.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

11. Toxicological Information

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Causes Serious Eye Irritation

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May cause skin irritation. Allergic reactions are possible.

EFFECTS OF OVEREXPOSURE - INHALATION: High gas, vapor, mist or dust concentrations may be harmful if inhaled. High vapor concentrations are irritating to the eyes, nose, throat and lungs. Harmful if inhaled. Avoid breathing fumes, spray, vapors, or mist. Prolonged or excessive inhalation may cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Overexposure to xylene in laboratory animals has been associated with liver abnormalities, kidney, lung, spleen, eye and blood damage as well as reproductive disorders. Effects in humans, due to chronic overexposure, have included liver, cardiac abnormalities and nervous system damage. IARC lists Ethylbenzene as a possible human carcinogen (group 2B). Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headaches, paralysis, and blurred vision) and/or damage.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

ACUTE TOXICITY VALUES
The acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
106-97-8	n-Butane	N.E.	N.E.	658 mg/L Rat
64742-49-0	Naphtha, Petroleum, Hydrotreated Light	>5000 mg/kg Rat	>3160 mg/kg Rabbit	>4951 mg/L Rat
64742-47-8	Hydrotreated Light Distillate	>5000 mg/kg Rat	>2000 mg/kg Rabbit	>5000 mg/L Rat
1330-20-7	Xylenes (o-, m-, p- isomers)	3500 mg/kg Rat	>4350 mg/kg Rabbit	29.08 mg/L Rat
100-41-4	Ethylbenzene	3500 mg/kg Rat	15400 mg/kg Rabbit	17.4 mg/L Rat
3520-72-7	Pigment Orange 13	>5000 mg/kg Rat	N.E.	N.E.
14808-60-7	Crystalline Silica / Quartz	5500 mg/kg Rat	5500	100 mg/L

N.E. - Not Established

12. Ecological Information

ECOLOGICAL INFORMATION: Product is a mixture of listed components.

13. Disposal Information

DISPOSAL INFORMATION: Do not incinerate closed containers. This product as supplied is a USEPA defined ignitable hazardous waste. Dispose of unusable product as a hazardous waste (D001) in accordance with local, state, and federal regulation.

14. Transport Information

	Domestic (USDOT)	International (IMDG)	Air (IATA)	TDG (Canada)
UN Number:	N.A.	1950	1950	N.A.
Proper Shipping Name:	Paint Products in Limited Quantities	Aerosols	Aerosols	Paint Products in Limited Quantities
Hazard Class:	N.A.	2.1	2.1	N.A.
Packing Group:	N.A.	N.A.	N.A.	N.A.
Limited Quantity:	Yes	Yes	Yes	Yes

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Gas under pressure, Carcinogenicity, Specific target organ toxicity (single or repeated exposure)

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
Xylenes (o-, m-, p- isomers)	1330-20-7
Ethylbenzene	100-41-4

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(b) if exported from the United States:

Chemical Name	CAS-No.

Castor oil, sulfated, sodium salt 68187-76-8

16. Other Information

HMIS RATINGS

Health:	2*	**Flammability:**	4	**Physical Hazard:**	0	**Personal Protection:**	X

NFPA RATINGS

Health:	2	**Flammability:**	4	**Instability**	0

Volatile Organic Compounds 549 g/L

SDS REVISION DATE: 8/7/2018

REASON FOR REVISION:
Substance Regulatory CAS Number Changed
Substance Hazardous Flag Changed
Substance Hazard Threshold % Changed
Substance Chemical Name Changed
Substance and/or Product Properties Changed in Section(s):
02 - Hazard Identification
03 - Composition/Information on Ingredients
15 - Regulatory Information
16 - Other Information
Revision Statement(s) Changed

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

The manufacturer believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. The manufacturer makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users' consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.

HASP - APPENDIX C

Incident Report Form

Incident Report

Please Note: this form must be completed within (24) hours of an employee's injury or illness during the workday. This form can be completed by the employee or supervisor (or a witness if his/her supervisor is unavailable).

EMPLOYEE

Date of Incident	Employee's Name (First, MI, Last)	Full Address Where Incident Occurred	County

Time of Incident	Employee's Group	Employee's Occupation / Title

Please describe, in detail, what happened to cause the incident (conditions working under, how accident happened, etc.)

List the Nature of the Employee's Injury and Body Parts Affected (Indicate whether a similar work-related injury has occurred in the past):

What Was Employee Doing When Incident Occurred? (Be specific. If any tools/equipment involved, list them.)

How Did The Incident or Exposure Occur? (Describe fully the events, which resulted in the injury/illness.)

Object or Substance That Directly Injured Employee or Caused Illness? (Describe what caused injury/illness.)

Signature: Date:

SUPERVISOR

Hours at Work Before Incident?	Date Stopped Work Because Of This Injury/Illness	Was Employee Paid In Full For Day?	Name & Address of Doctor

Did You Provide Medical Care? (If Yes, When?)	Has Employee Returned to Work? (If Yes, When?)	Date You First Knew of Injury/Illness	Name & Address of Hospital	Type of Treatment Provided (Be specific with procedures performed, medication provided etc.)

Apparent Causes (List causes that appear to have directly contributed to the incident - unsafe acts and conditions.)

Immediate Actions Taken (List actions that will successfully prevent recurrence.)

Print Name (First, MI, Last) _____
Signature: Date:

HR

Loss Time	Restricted Duty	Severity of Injury/Illness (Circle One)		
❑Yes ❑No	❑Yes ❑No	Severe	Moderate	Minor

Date Injury/Illness Became Loss Time/Restricted Duty	Was Incident on Employer's Premises?	Is Case Recordable? *(H&S)* (If Yes, OSHA Case/File No.)	Date You First Knew Of Injury/Illness

Comments:

Print Name (First, MI, Last) _____
Signature: Date:

RETURN COMPLETED FORM WITHIN 24 HOURS OF THE INCIDENT TO RILEY SIMONE IN HUMAN RESOURCES

PHONE NUMBER - (518) 453-4518

E-MAIL ADDRESS – RSIMONE@CHACOMPANIES.COM

A follow up form will be completed by Health & Safety

cc: M. Platt
R. Rogers

HASP - APPENDIX D

OSHA Quick Cards

OSHA QUICK CARD™

Protect Yourself

Construction Personal Protective Equipment (PPE)

Eye and Face Protection

- Safety glasses or face shields are worn any time work operations can cause foreign objects to get in the eye. For example, during welding, cutting, grinding, nailing (or when working with concrete and/or harmful chemicals or when exposed to flying particles). Wear when exposed to any electrical hazards, including working on energized electrical systems.
- Eye and face protectors – select based on anticipated hazards.

Foot Protection

- Construction workers should wear work shoes or boots with slip-resistant and puncture-resistant soles.
- Safety-toed footwear is worn to prevent crushed toes when working around heavy equipment or falling objects.

Hand Protection

- Gloves should fit snugly.
- Workers should wear the right gloves for the job (examples: heavy-duty rubber gloves for concrete work; welding gloves for welding; insulated gloves and sleeves when exposed to electrical hazards).

Head Protection

- Wear hard hats where there is a potential for objects falling from above, bumps to the head from fixed objects, or of accidental head contact with electrical hazards.
- Hard hats – routinely inspect them for dents, cracks or deterioration; replace after a heavy blow or electrical shock; maintain in good condition.

Hearing Protection

- Use earplugs/earmuffs in high noise work areas where chainsaws or heavy equipment are used; clean or replace earplugs regularly.

For more complete information:

OSHA Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA

OSHA 3260-09N-05

CHA Consulting, Inc.

Job Hazard Analysis

Environmental Sampling/Outdoor Hazards

Task	Hazard Type and Description	Hazard Control
Working in hot environments	Heat disorders including heat cramps, heat exhaustion, and heat stroke	Employers can control this hazard by providing heat stress training to exposed employees, providing access to shade, and allowing employees to gradually get used to hot environments. Employees working in hot environments are advised to take breaks in cool rest areas, rotate physically demanding tasks, save most demanding work for cooler times of day, and utilize the heat index chart to determine exposure risk. Be sure that every employee working in the hot environments is drinking one cup of water ever fifteen minutes. Recognize the signs such as above normal body temperature, headaches, nausea, cramping, fainting, increased heart rate, and pale as well as clammy skin.
	Sunburn	The risk of sunburn is higher when working at high elevations, or when working around water (from reflection). In these conditions, you can be burned even in overcast conditions; therefore, wear protective clothing and use sunscreen.

High wind events	Severe wind events can create "wind throws" where strong winds can blow down trees	Employees should avoid areas during high wind occurrences that exhibit previous wind damage
Working at high altitudes	Altitude sickness	Recognize signs of acute mountain sickness including headaches, light-headedness, inability to catch one's breath, nausea, and vomiting. Practice prevention by acclimating slowly to high elevations and staying hydrated. If the following symptoms progress, immediately descend to lower elevations and seek medical attention: difficulty breathing, chest pain, confusion, decreased consciousness, and loss of balance
Electrical storms	Being struck by lightning	While working outside, watch the sky for thunderstorms and seek shelter before the weather deteriorates. Stop working in streams and lakes. Someone at the job site must be able to begin revival techniques (i.e. CPR) if someone is struck by lightning. Do not use telephones. If caught in electrical storms, seek shelter inside a vehicle or building. When in a building, keep away from doors, windows, plugged in appliances, and metal. When in a vehicle, avoid contact with metal objects inside. If outside with no shelter, obey the following procedures: do not congregate, do not use metal objects, avoid standing near isolated trees, seek lower elevations such as valleys or canyons, and avoid being on peaks as well as trees. If you feel your hairs standing on end and your skin tingling, this is a sign that lightening might be about to strike so crouch immediately (feet together, hands on knees). Wait a minimum of 20-30 minutes after the last lightning flash to return to the field or outside area.

Being outdoors in cold weather for extended periods of time	Hypothermia	Recognize the signs including shivering, numbness, drowsiness, muscle weakness, dizziness, nausea, unconsciousness, low/weak pulse, and large pupils. Exercise practice prevention such as staying dry, wearing the appropriate clothing (layers), listen to the weather forecast to plan accordingly, stay hydrated, cover head with warm clothing, and stay active. Be aware of the role that wind-chill can play in hypothermia; under certain conditions, hypothermia can occur without any rain or being wet.
	Frostbite	Dress for the weather- layers are best, and mittens are better than gloves (keeps your warm fingers together while warming each other). Wear two pairs of socks with the inner layer made of synthetic fiber, such as polypropylene, to wick water away from the skin and the outer layer made of wool for increased insulation. Shoes should be waterproof. Keep your head, face, nose, and ears covered at all times. Clothes should fit loosely to avoid a decrease in blood flow to the arms and legs. Always travel with a friend in case help is needed. Be especially wary of wet and windy conditions; the "feels like" temperature (wind chill) is actually much lower than the stated air temperature. The very old, those who are not in good physical condition, and people with diabetes and anyone with vessel disease should take extra precautions.

Working in areas with limited access to clean drinking water	Giardia	Treat, filter, or boil drinking water. Do not drink untreated water from streams, lakes or springs.
Working outdoors	Rattlesnakes	Be alert and do not put your feet or hands where you cannot see what is on the ground (for example if you are stepping over a log and you cannot see what's on the other side). If you encounter a rattle snake do not pick it up- give it a wide berth and walk around it. If bitten, seek immediate professional medical attention and remove jewelry. If bitten on an extremity lower than the heart, cover wound with a sterile band while seeking medical attention.
	Bears	If you encounter a bear, be alert but stay calm, and give it as much room as possible. Try to leave the area, but DO NOT RUN. Back away slowly. If the bear follows, stop and hold your ground: wave your arms to make yourself look big and talk in a normal voice. Work in teams of two to deter bear attacks. If the bear makes contact, surrender: fall to the ground and play dead (a bear will break off an attack once it feels the threat has been eliminated). If the bear continues to bite after you assume a defensive posture, its attack is predatory and you should fight back vigorously.
	Mountain Lions	Be alert, calm, and do not panic. If you see a mountain lion, do not run as it may stimulate its predatory nature. Instead, shout and wave arms to let it know that you are not prey. Fight back.

	Tick bites	Use DEET based repellants on exposed skin and/or permethrin on clothes. Check for ticks during and after field work. If you find a tick remove it with tweezers within 24 hours, preferably immediately: do not leave the head embedded or extract the tick with matches, petroleum jelly, or other coatings (e.g. motor oil)
	Roughskin Newts	Avoid handling them as their skin contains a potent neurotoxin. If necessary for the protocol, handle only when wearing gloves. Do not "lick" for "killer buzz" as people have died from attempting to eat roughskin newts
	Bee stings	If you know or suspect you are allergic to bee stings, carry appropriate allergy kits prescribed by a doctor for treating anaphylactic shock. Carry and take diphenhydramine (Benadryl). Follow the label instructions for allergy control. Inform your supervisor if you suspect you are allergic. Watch for ground nests
Travel movement or work in area with poison oak or poison ivy	Allergic reaction to poison oak/poison ivy plants	Learn to recognize poison oak. Avoid contact by using ivy block and wearing long pants and long-sleeve shirts if traveling in dense areas. If skin contact is made, flush the area with cold water as soon as possible. Do not flush your skin with warm water or soap as it can open your pores and increase the reaction. To wash and rinse use Tecnu or similar product with cold water to remove oils.

Encountering irrigation pipes, marijuana plantation, or grow operations	Unfriendly encounters with criminal elements	Do not wear uniforms and carry a radio backpack that is not visible. Do not confront strangers and act like a tourist if you must speak. Work in pairs or groups. If working in areas likely to contain operations, check in with park staff when leaving vehicle and returning to vehicle. Watch for black piping or other signs. If you find a definite grow operation, leave immediately, note the location, and report it to the authorities.

CHA Consulting, Inc.

Job Hazard Analysis

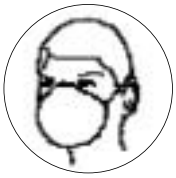
Heavy Equipment

Task	Hazard Type and Description	Hazard Control
Heavy equipment	Pinch points Struck-by/Caught between	Never work or walk under loads, and only one person is to act as the signal person. Avoid working near swing radii. Maintain eye contact with operators when approaching equipment. Rigger s and Operators must possess additional safety training for competency. (Competent/Qualified Training).
Road grading and material cleanup	Potential for personnel to be run over with equipment Struck-by/Caught between	Ensure equipment is operated by qualified operator, and all personnel working on or near roadway wear reflective vests. Be sure that equipment back-up alarms are working properly. Always make eye contact with equipment operators prior to approaching.
Personnel working near heavy equipment	Slips and falls Struck-by/Caught between	Make sure there is a good working surface. Cover or barricade excavations as soon as practical. Wear a hard hat, safety glasses, ear plugs, a Class II ANSI safety vest as well as steel toed boots when necessary.
Operation	Strains and sprains	Think about your body position; avoid over- reaching, hyper-extending, location/ position of extremities, and think if you are in the best position for leverage.

OSHA QUICK CARD™

Protect Yourself
Respirators

Respiratory protection must be worn whenever you are working in a hazardous atmosphere. The appropriate respirator will depend on the contaminant(s) to which you are exposed and the protection factor (PF) required. Required respirators must be NIOSH-approved and medical evaluation and training must be provided before use.

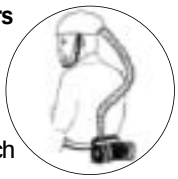


Single-strap dust masks are usually not NIOSH-approved. They must not be used to protect from hazardous atmospheres. However, they may be useful in providing comfort from pollen or other allergens.

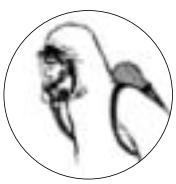
Approved filtering facepieces (dust masks) can be used for dust, mists, welding fumes, etc. They do not provide protection from gases or vapors. DO NOT USE FOR ASBESTOS OR LEAD; instead, select from the respirators below.

Half-face respirators can be used for protection against most vapors, acid gases, dust or welding fumes. Cartridges/filters must match contaminant(s) and be changed periodically.

Full-face respirators are more protective than half-face respirators. They can also be used for protection against most vapors, acid gases, dust or welding fumes. The face-shield protects face and eyes from irritants and contaminants. Cartridges/filters must match contaminant(s) and be changed periodically.



Loose-fitting powered-air-purifying respirators (PAPR) offer breathing comfort from a battery-powered fan which pulls air through filters and circulates air throughout helmet/hood. They can be worn by most workers who have beards. Cartridges/filters must match contaminant(s) and be changed periodically.



A Self-Contained Breathing Apparatus (SCBA) is used for entry and escape from atmospheres that are considered immediately dangerous to life and health (IDLH) or oxygen deficient. They use their own air tank.

For more complete information:

OSHA Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov (800) 321-OSHA

OSHA 3280-10N-05

CHA Consulting, Inc.

Job Hazard Analysis

Slips/Trips/Falls

Common hazards

- Slippery surfaces (e.g., wet, oily or greasy)
- Seasonal trip hazards (snow and ice)
- Spills of wet or dry substances
- Changes in walkway levels and slopes
- Unsecured mats
- Poor lighting
- Debris and items stored in walkways
- Trailing cables in pedestrian walkways
- Smoke, steam or dust obscuring view
- Unsuitable footwear

Controlling hazards

When establishing safe work practices, consider:

- Characteristics of physical work area
- Weather conditions (snow, ice, rain)
- Tasks performed
- Workers' work practices
- Equipment

Hazard Control/Engineering Controls

- Type of flooring
- Slope of surface (ramps, handrails)
- Surface free of obstructions/holes
- Drainage
- Lighting levels, non-glare, contrast
- Equipment to be used/not carrying too much at once
- Signage
- Sufficient space
- Minimizing environmental influences, e.g., blocking wind to prevent wet surfaces icing at entrances

Hazard Control/Administrative Controls

- Training workers/awareness
- Safe practices such as a procedure for cleaning spills or requirement for two workers to transport a large equipment that one worker cannot see around or can’t handle
- Reporting hazards
- Prompt maintenance
- Job design (identifying tasks requiring excessive pushing/pulling, line-of-sight obstruction)
- Equipment readily available
- Addressing poor work practices
- Inspections
- Review slips, trips and same-level fall hazards

Hazard Control/Housekeeping

- Clean spills
- Remove debris, snow and ice
- Keep equipment clean
- Keep wires, etc. controlled, taped, etc.

Hazard Control/Personal Protective Equipment

- Appropriate footwear for task, which may include appropriate heels, soles and anti-slip boots

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APPENDIX B

Standard Operating Procedures

Author: Sarah Benson
Reviewer(s): Keith Cowan
Sandy Warner

SAMPLE NAMING AND NUMBERING

A. PURPOSE/SCOPE:

The success of large environmental programs is greatly affected by the efficiency of data management and analysis. When performing environmental sampling, one of the most critical steps is appropriately naming or numbering samples so that they are uniquely identified and can be distinguished from all other samples by all future users.

Some of the potential benefits that can be obtained by adopting a naming convention include the following:

a. To ensure that every sample collected at a site has a unique identifier

b. To enhance clarity in cases of potential ambiguity

c. To help avoid "naming collisions" that might occur when the data is imported into our Equis or other databases; and

d. To provide meaningful data to be used in project handovers.

Note that many of our sampling programs are performed at sites with previously established sample locations and in these cases, we would not change sample names. Additionally, this process shall be applied at larger, more complex sites, and/or sites that are required to follow a site- specific QAAP. Simpler naming conventions may be implemented for small, simple sites.

B. EQUIPMENT/MATERIALS:

- Field Logbook
- Field Sample Login Sheet
- Site Map/ Work Plan
- Sampling Forms
- Chain-of-Custody
- Sample Containers with Labels

C. PROCEDURE:

1. Each sample shall be uniquely defined by a multi-field name. In general, three fields are required: [Project # or Name] – [Media Type] – [Location Name/Sequential Number].
2. If using a site name, abbreviate to 2-3 letters. (e.g., Congress St site would be “CS”).
3. Use the following abbreviations for media types:

Subsurface Soil	SOIL
Surface Soil	SURF
Sediment	SED
Groundwater	GW
Surface Water	SW
Waste Water	WW
Soil Vapor	SV
Storm Water	STORM

SAMPLE NAMING AND NUMBERING

4. All samples collected at a site shall be numbered sequentially for each media type, regardless of the field event or project phase. The use of hyphens to separate segments of a sample name is beneficial for sample name readability. It is also beneficial to use enough leading zeros to accommodate the Sequential Number (or sys_loc_code) portion of the sample name, which will assist in sorting sample IDs in the data management program or database (see EQUIS discussion below).
5. Do not include information such as time, sample depths, etc. in the name. This information should be recorded as defined in Section F (below).
6. In no cases shall the multi-field name be longer than 30 characters, including dashes. Ensure that each name is clearly written on both the sample label as well as the Chain of Custody.
7. Do not use special characters (e.g. #, ‘, “, @, !) when naming samples. Including such characters in the Serial Number (sys_loc_codes) or Sample Number (sys_sample_codes) can be incompatible with the database.
8. For QA/QC blank samples use the following abbreviations in place of the media type:

Trip Blank	TB
Equipment Rinse (Field Blank)	FB
Duplicate	DUP
Matrix Spike	MS
Matrix Spike Duplicate	SD

For Duplicate and MS/MSD samples we need to make sure we include the parent sample name. Add the DUP, MS or MSD indicator after the Sequential Number.

For Blind Duplicate samples, use the CHA indicator in place of the Sequential Number. The location should be recorded in the field logs for our evaluation purposes. For example, a blind duplicate sample number for soil collected at the 005 location would be “CS-SOIL-CHA-1.”

You would record in the field log that the blind soil duplicate CHA-1 has SOIL-12345-005 as its parent sample.

9. Option to Include the Sample Collection Date - As an option, the date may be included in the sample name. NYS Electronic Data Deliverable guidance suggests using dates in the YYYYDDMM format. Placing the year first provides for ease of sorting data in the database:

   However, adding the date adds 9 characters to the sample name thus increasing the complexity of sample numbering. The date is captured on the Chain-of-Custody and in field records.

D. QA/QC REQUIREMENTS:

All data must be documented on field data sheets or within site logbooks.

Field personnel should verify that all sample data and supporting information in log books is correct prior to leaving the site.

SAMPLE NAMING AND NUMBERING

E. SPECIAL CONDITIONS:

NYSDEC EQUIS Considerations:

NYSDEC uses EQuIS for data management and generally requires data to be submitted in EQuIS format. EQuIS has three different sample name related fields, a sample_name, a sys_sample_code and a location_ name. Location_name will almost always be simplified to something like SW-1, GW-2 etc. and is usually the last field of the sample name.

In terms of the other two, sample_name is what we record in the field. That is limited to 30 characters of text.

The laboratory generates the sys_sample_code by taking the sample_name field and adding another qualifier, such as the sample delivery group or work order number. EQuIS requires that the sys_sample_code field be unique within a database. This is limited to 40 characters of text so it typically will be the sample name plus up to 10 characters.

It is recommended to keep the CHA sample name as short as possible to work with the EQuIS format. The basic sample names identified above are 14 to 17 characters long. If the optional date format is used, sample names will be 23 to 26 characters which is near the limit for what EQuIS can accommodate (and you may have issues physically fitting the sample names legibly into the COC form).

F. REFERENCES:

NYSDEC, DER-10, Technical Guidance for Site Investigation and Remediation, May 2010, http://www.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

NYSDEC, Electronic Data Delivery Manual, January 2013, http://www.dec.ny.gov/docs/remediation_hudson_pdf/eddmanual.pdf

New Jersey Department of Environmental Protection, August 2005, Field Sampling Procedures Manual, Chap. 6, http://www.nj.gov/dep/srp/guidance/fspm/

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 12/2/15

Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner

COMPLETING A CHAIN-OF-CUSTODY RECORD

A. PURPOSE/SCOPE:

This protocol provides a standard operating procedure (SOP) for initiating and maintaining a Chain of Custody (COC) document. A COC is a legal document designed to track persons who are responsible for the preparation of the sample container, sample collection, sample delivery, sample storage, and sample analysis. A COC is an appropriate format to record important data associated with each individual sample. In general, a sample requiring a COC will follow a path as follows:

Sample Collector → Sample Courier/Operator → Sample Custodian

Verification of who has possessed the samples and data and where the samples have been is completed when staff follow chain-of-custody procedures.

B. EQUIPMENT/MATERIALS:

- Chain of Custody form
- Ball-point, permanent pens
- Gallon-Sized Ziploc Bag (to keep COC dry)
- Field Logbook
- Custody seals
- Padlock(s) (optional)

C. PROCEDURE:

1. Once a sample has been determined to require a COC, the Sample Collector must initiate the COC. The Sample Collector must fill in the fields provided on the COC. The words "Chain of Custody" must be located in a conspicuous location at the top of the document.
2. The form is generally a three-page carbon copy document, including a white, yellow and pink sheet. While CHA generally uses COCs provided by the applicable laboratory, it is important to ensure that the COC from each lab contains places for all necessary information.
3. The COC at that time should include the fourteen-digit CHA project number and phase, the project name and location.
4. The Client Information Section must be completed. In most cases the "client" will be CHA Consulting, Inc.
5. The first field of information is the Sample Identification or Sample Identification Number. This identification/number must match the identification/number located on the sample container.
6. An information line for the date, time, phone number, printed name of Sample Collector, signature of Sample Collector, organization name (no acronyms), organization's full mailing address, and sample description must also be included.
7. Sampling personnel should enter the sample number(s) (which should correspond with a unique number on a sample container [SOP #103] if applicable, and parameters to be analyzed. The "Sample ID" must be included and must match the number on the sample.

COMPLETING A CHAIN-OF-CUSTODY RECORD

8. Subsequent fields must be provided to allow for documentation of information about any subsequent Sample Couriers/Operators or Sample Custodians. These fields must contain the date, time, phone number, printed name of person taking custody of sample, signature of person taking custody of sample and organization name (no acronyms).
9. Field Information - The COC must contain places to enter the following field information: sample number, sampling date, and type of sample. Other field information may be recorded as specified in the field sampling plan or proposal for the project. It is imperative that there be only one sample with a particular sample number per project/study so as to prevent duplicates in Excel files and EQuIS databases.
10. Laboratory Information - Once the sample is delivered to the lab, the laboratory personnel will sign and date the "received by" line located at the bottom of the COC. Other laboratory information may be recorded as specified in the project/study work plan/proposal.
11. Signatures - The COC must contain places for all people who handle the sample to sign his/her name. This is a record of persons who had custody of the sample during all steps of the process from container preparation, sample collection, sample storage and transport, and sample analysis. There should be signature lines to relinquish custody of the sample and to receive custody of the sample.

D. QA/QC REQUIREMENTS:

The Field Team Leader or senior person on the sampling team will review the completed COC form to verify that all fields are properly completed. For purposes of this SOP, signing the form under Collected/Delivered by is considered evidence that the COC form has been checked for accuracy and completeness.

E. SPECIAL CONDITIONS:

Whenever samples are split with a source or government agency, a separate chain of custody form should be completed for the samples and the relinquisher (sampler) and recipient should sign. If a representative is unavailable or refuses to sign for the samples, this can be noted in the “remarks” area of the form. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time. A copy of the chain of custody form for split samples must be kept with the project file.

Samples may require short term storage in field locations prior to delivery to the laboratory for analyses. The storage may be in vehicles or lodging locations. The samples must be secured to limit access to them. A locked vehicle is considered controlled access. However, simply a locked lodging room is not secure due to potential custodial access. If an unattended lodging room is used for sample storage, the samples must be further secured. This may entail a padlock on the ice chest, samples in an ice chest secured in an inner bag with a custody seal on it, and/or ice chest taped shut with custody seal on the outside of it.

F. REFERENCES:

Sampling Guidelines and Protocols, NYSDEC, http://www.dec.ny.gov/regulations/2636.html
Chain of Custody Protocol is in Appendix 5X.2.

COMPLETING A CHAIN-OF-CUSTODY RECORD

Chain of Custody Procedures for Samples and Data, EPA 50 minute Self Instructional Course:
http://www.epa.gov/apti/coc/

SOP for Chain of Custody, EPA Region 1:
http://www.epa.gov/region6/qa/qadevtools/mod5_sops/misc_docs/r1_chain-of-custody.pdf

G. APPENDICES/FORMS:

CHA COC Form

END OF SOP
Final Check by C. Burns 10/7/15

Original Author: Joseph Saulsbery
Latest Revisions by: Raylani Reis
Reviewer: Samantha Miller, P.E.

SAMPLING PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) and PERFLUORINATED COMPOUNDS (PFCS)

A. PURPOSE/SCOPE:

The objective of this SOP is to ensure proper and uncontaminated collection of per- and polyfluoroalkyl Substances (PFAS) and other Perfluorinated Compounds (PFCs). PFAS and PFCs are large groups of manufactured compounds used as surfactants in industrial applications, applied to many household products for grease, water, heat, and stain resistance, and heavily used in Aqueous Film Forming Foams (AFFF) which are often used in firefighting. Although there are no federal regulations currently requiring remedial action for these chemicals (only drinking water), many states are adopting rules and regulations regarding these compounds. As rules continue to develop for these contaminants permitted and non-permitted equipment, materials, and procedures are subject to change. The user of this SOP should consult with applicable regulatory agencies to determine a final list of compounds that need to be analyzed.

Note: This SOP has been developed assuming that there are no elevated concentrations of more toxic chemicals present at the site warranting additional personal protective equipment. However, before commencing sampling activities, the sampler should consider all potential contaminants at the site and determine if additional protocols are necessary.

Due to the prevalence of these chemicals in common goods, it is imperative that field personnel are conscious of potential cross-contamination. This contamination can be from field equipment, field clothing and PPE, sample containers, decontamination, and food.

B. EQUIPMENT/MATERIALS:

Equipment/Materials that are NOT PERMITTED: Field equipment, field clothing, PPE, sample containers, and any other items that may be used or present on-site made of or containing the following materials **ARE NOT PERMITTED** in the work area where PFAS and/or PFCs are being sampled:

- Low density Polyethylene (LDPE)
- Aluminum foil
- Glass
- Polytetrafluoroethylene (PTFE) / Teflon™
- Waterproofed clothing or boots
- Clothing containing PTFE material (i.e. GORE-TEX®)
- New clothing (clothing not washed a minimum of 6 times) or clothing washed with fabric softeners
- Polypropylene-coated coveralls and PVC boot covers completely covering personnel's street clothes are an acceptable alternative.
- Tyvek® material
- Waterproof/treated paper or field books
- Plastic clipboards, binders, or spiral hard-cover notebooks
- Post-it notes or other adhesives
- Sharpies or other permanent markers

SAMPLING PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) and PERFLUORINATED COMPOUNDS (PFCS)

- Paint pens, marking paint, etc.
- Most insect repellents, sunscreens, moisturizers, cosmetics, or other related products
- Decon 90 cleaning agent
- Ice packs (blue ice)

A complete list of what is and is not permitted can be found in Appendix A. This list should be given to personnel well in advance of sampling to ensure compliance.

Materials such as Teflon™ or PTFE may be found in common sampling equipment. Field personnel must examine and assess existing equipment to avoid accidental contamination.

Equipment/Materials that are PERMITTED: The following materials are **ALWAYS PERMITTED** in sampling equipment and the work area:

- Stainless steel
- High density polyethylene (HDPE)
- PVC
- Nitrile
- Silicone
- Acetate
- Polypropylene
- Loose paper on aluminum clipboards
- Ballpoint pens
- Regular ice

There are changes necessary in several CHA SOPs when sampling for PFAS and PFCs. The changes relate to the sampling equipment and supplies used and are as follows for each SOP as referenced:

Surface Soil Sampling (SOP #405)

- A stainless steel spoon should be used for surficial soil sampling (0-6") Turf should be removed before soil sampling with a steel trowel or shovel without any coatings.
- A stainless steel spoon and bowl should be used to mix the soil sample before filling the sample jar since PFAS are considered SVOCs. Cover the bowl with a stainless steel lid where possible between adding each aliquot. Do NOT cover the bowl with aluminum foil.

Soil Sampling with a Hand Auger (SOP #305)

- A stainless steel hand auger without any coatings must be used when sampling. Auger to the appropriate depth and then use a pre-cleaned hand auger or spoon to collect the sample.
- Scoops and spatula used must be stainless steel.

SAMPLING PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) and PERFLUORINATED COMPOUNDS (PFCS)

- A stainless steel spoon and bowl should be used to mix the soil sample before filling the sample jar since PFAS are SVOCs. Cover the bowl with a stainless steel lid where possible between adding each aliquot. Do NOT cover the bowl with aluminum foil.

Borehole Installation and Sampling (SOP #303/309)

- If using hollow stem augers/split spoons or similar, they must be carbon steel and not coated.
- If collecting a soil or sediment core sample (e.g. Geoprobe®), it must be collected directly from single-use PVC liners that must not be decontaminated or reused at different locations.

Well Development (SOP #311)

- Do not use bailers, unless entirely made of PVC or stainless steel. Teflon in any part of the bailer is not acceptable.
- Do not use bladder pumps since most bladders are made of Teflon. Only bladder pumps with a bladder made of natural rubber are acceptable.
- Other pump types are typically okay but should still be examined for Teflon or other prohibited materials.

Conventional Groundwater Sampling (SOP #315) / Low-Flow Groundwater Purging/ Sampling (SOP #317) / Residential Well Sampling (SOP #319)

- Bailers should not be used unless entirely made of PVC or stainless steel. Teflon is not acceptable. Single-use disposable high density polyethylene or silicone materials are also acceptable.
- Tubing can only be made of HDPE or silicone.
- Do not use bladder pumps, most bladders are made of Teflon. Only bladder pumps with a bladder made of natural rubber are acceptable.
- The following pump types are acceptable by NYSDEC:
  - Stainless steel inertia pump with HDPE tubing
  - Peristaltic pump equipped with HDPE tubing and silicone tubing
  - PFAS-free bladder pump with HDPE tubing
- Other pump types are typically okay but should still be examined for Teflon or other prohibited materials.

Small Equipment Decontamination (SOP #501)

- Use a standard two-step decontamination process using detergent (Alconox® and Liquinox® are acceptable) and clean PFAS-free water. The PFAS-free water should be verified as PFAS-free through lab analysis or certification.
- Do NOT use aluminum foil to wrap or seal equipment.

Field Handling, Packaging, and Shipping (SOP #607)

- Plastic bags must be polyethylene.
- Only ice from water should be used, not chemical (blue) ice, and not ice pack.

These equipment changes can be applied to other SOPs if PFAS and/or PFCs are being sampled. If equipment is not specifically mentioned, refer to the list of materials that are always permitted. If the materials are not mentioned DO NOT use that sampling equipment.

C. PROCEDURE:

Standard operating procedures for sampling as outlined in several CHA's SOPs should be followed, but with the specific changes listed below for the specific SOPs referenced, if being used:

Borehole Installation and Sampling (SOP #303/309)

- When drilling the well use PFAS-free drilling fluids.
- Don't use detergent to decontaminate drilling equipment except Alconox® and Liquinox®. Scrub with equipment a plastic brush to remove heavy soiling and rinse thoroughly in tap water. Use a steam cleaner or a triple-rinse of PFAS-free water as the final step. If large quantities of

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PFAS-free water are not available from the lab, additional QA/QC sampling may be required to verify the source as a potential source of cross-contamination.
- Collect a representative water sample used during drilling activities.
- If using an auger, it must be carbon steel and uncoated.

Conventional Groundwater Sampling (SOP #315) / Low-Flow Groundwater Purging/ Sampling (SOP #317) / Residential Well Sampling (SOP #319)

- Collect samples from the pump discharge tubing only. Never collect a water sample that has passed through a flow-through cell or similar.
- When sampling prioritize drinking water, followed by surface water, followed by groundwater.
- When sampling groundwater; start with the upgradient well(s), then the furthest downgradient of the interpreted or known source, then wells downgradient to the source, and lastly the wells closest to the interpreted or known source.
- When sampling residential wells, any plumber's sealing tape should be noted, as these typically contain PFCs.
- Before sample collection, field personnel must wash their hands and wear a new set of nitrile gloves.
- PFAS/PFC samples should be taken first, before collecting samples for any other parameters into any other containers. Field personnel should avoid contact with any other type of sample container or package materials.
- When samples are collected and capped, place the sample bottle(s) in an individually sealed plastic bag (i.e. Ziploc®) separate from all other sample parameter bottles, and place in a shipping container packed only with ice made from frozen water. PFAS samples should be placed in a separate cooler from sample containers for other parameters (e.g. VOCs).
- After collecting PFAS samples conduct the "Shaker Test:" A small portion of the sample (~10-25 ml) should be shaken by the sample collector on site. If foaming is noted within the sample, this should be documented when samples are submitted for analysis.

Surface Water Sampling (SOP #401)

- Surface water must be collected by inserting a capped sampling container with the opening pointing down to avoid the collection of surface films.
- Where conditions permit, sampling devices should be rinsed with site medium to be sampled before collection of the sample.

Surface Soil Sampling (SOP #405)

- PFAS/PFC samples should be taken first, before collecting samples for any other parameters into any other containers. Field personnel should avoid contact with any other type of sample container or package materials.

- A stainless steel spoon and bowl should be used to mix the soil sample before filling the sample jar since PFAS are SVOCs. Cover the bowl with a stainless steel lid where possible between adding each aliquot. Do NOT cover the bowl with aluminum foil.

Large Equipment Decontamination (SOP #503)

- Don't use detergent to decontaminate drilling equipment, scrub with a plastic brush and rinse thoroughly in tap water, then triple-rinse in distilled or deionized water.

Field Handling, Packaging, and Shipping (SOP #607)

- Ice should be double bagged and secured to avoid meltwater from contacting sample containers, and/or samples should be in an individually sealed plastic bag.
- PFAS samples should be put in a cooler separate from other sample bottles for other parameters (e.g., VOCs).

D. LABORATORY REQUIREMENTS

A laboratory certified under the Environmental Laboratory Approval Program (ELAP) shall be contracted when analyzing for PFAS. The sample will be analyzed under EPA Method 1633 with the reporting limits less than or equal to:

- Aqueous Sample – 2 ng/L (ppt)
- Solid Sample – 0.5 µg/kg (ppb)

E. QA/QC REQUIREMENTS:

A variety of blanks should be collected to trace the sources of any artificially introduced contamination. Rinsate or equipment blanks, field blanks, and trip or travel blanks should all be collected during the sampling event. Rinsate or equipment blanks and field blanks should be collected once per day per matrix or once per 20 samples per matrix, whichever comes first. One trip blank is required per cooler.

Samples should be immediately placed in a cooler maintained at 4±2º Celsius.

Sampling Media	NYSDEC Requirements for Field Duplicate	NYSDEC Requirements for Equipment Blank	NYSDEC Requirements for MS/MSD	NYSDEC Requirements for Field Reagent Blank (FRB)	NYSDEC Requirements for Deliverable

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Groundwater	1 per sample batch; minimum 1 per 20 samples.	One per day per site; minimum 1 per 20 samples.	One set per sample batch; minimum 1 set per 20 samples.	n/a	Category B Report and EDDs.
Surface Water	1 per sample batch; minimum 1 per 20 samples.	One per day per site; minimum 1 per 20 samples.	One set per sample batch; minimum 1 set per 20 samples.	n/a	Category B Report and EDDs.
Soils/Sediment/ Solids	1 per sample batch; minimum 1 per 20 samples.	n/a	One set per sample batch; minimum 1 set per 20 samples.	n/a	Category B Report and EDDs.
Private Potable Water	1 per sample batch; minimum 1 per 20 samples.*	One per day per site; minimum 1 per 20 samples.*	One set per sample batch; minimum 1 set per 20 samples.*	One per 20 samples.*	Category B Report and EDDs.

** For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.*
n/a = not applicable.

F. SPECIAL CONDITIONS:

In the event of wet weather, field personnel must avoid using personal waterproof or water-resistant rain gear. Instead, a gazebo popup tent that is only touched or moved before or after sampling activities should be used.

No food or drink is permitted in the sampling area while sampling is performed. Bottled water and hydration drinks, such as Gatorade, should only be consumed in the staging area. When field personnel require a break to eat or drink, they should remove their gloves and coveralls and move away from the sampling location, preferably downwind. When finished drinking and/or eating, field personnel should clean up, put their coveralls back on, and don a new pair of gloves before returning to the work area.

Visitors to the site are asked to remain at least 30 feet from sampling areas.

SAMPLING PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) and PERFLUORINATED COMPOUNDS (PFCS)

G. REFERENCES:

Chiang, D., Ph.D., P.E., Davis, K., Ph.D., Bogdan, D., Ph.D., Aucoin, M., & Woodward, D. (n.d.). PFAS Sampling. AECOM.

National Groundwater Association Press 2017, Groundwater and PFAS: State of Knowledge and Practice, Section 5, Field Sampling and Analysis.

NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs. April 2023.

United States Environmental Protection Agency Office of Water. Method 1633 Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS. January 2024.

H. APPENDICES/FORMS:

Appendix A - PFAS/PFC Sampling – Acceptable and Prohibited Items

END OF SOP
Final Check – S. Smith

SURFACE SOIL SAMPLING

A. PURPOSE/SCOPE:

The following SOP presents a description of the methods generally employed for the collection of surface soil samples. Surface soils are generally collected to determine risk associated with exposure to potentially contaminated surface soils or to determine whether contaminants are present above applicable standards.

Surficial soil sampling is generally conducted in potentially contaminated areas of concern, whether relating to former or current uses of the site, to determine whether contaminants are present above applicable standards. Locations should be biased to suspected areas of greatest contamination including stressed vegetation, soil discoloration, odor, etc. Sample locations are also chosen based on area specific requirements. This includes sampling in locations that includes past or present usage or hazardous substances or wastes, discharge points of past or present processes, and former and current containers that may contain or previously contained hazardous substances or waste.

B. EQUIPMENT/MATERIALS:

The equipment needed for this task will vary depending on the exact nature of the project but needed supplies may include:

- Stainless steel trowel or scoop
- Stainless steel spatula
- Shovel
- Stainless steel bowls
- Wooden stakes and flagging, or wire flags
- Hammer or mallet
- Indelible ink pens (sharpies)
- Measuring tape (length appropriate for the project)
- Appropriate sample jars
- Field logs
- GPS unit for referencing sample locations
- Latex or nitrile gloves
- Non-phosphate detergent, distilled water, and paper towels.

C. PROCEDURE:

1. Use the shovel to clear any surface debris from the sampling location, including grasses or other vegetation.
2. If appropriate to the investigation, screen the soil with a PID or FID and record the results on the Field Log.
3. Sampling Procedure:

   Discrete Sample Collection:

   a. Collect the sample from 0-6 inches depth (or as specified by the project). In instances where a soil is collected for VOC analysis as well as other non-VOC parameters, the soil for VOC analysis must be collected first to minimize volatilization and biodegradation.

SURFACE SOIL SAMPLING

b. When analyzing for VOCs, the soil sample must be collected directly from the soil sample location into the sample container without disturbing the matrix structure.

c. Once VOC soil sampling is complete, the remaining soil to be analyzed for non-VOC parameters such as SVOCs, pesticides, PCBs, metals, or cyanide must be homogenized to create a representative sample. Prior to homogenization, twigs, roots, leaves, rocks, and miscellaneous debris should be removed from the sample using the decontaminated stainless steel spoon or spatula. The soil should be mixed, quartered (divided into 4), and mixed again until a consistent physical appearance over the homogenized soil has been obtained. The soil should be transferred into the appropriate sample container using the decontaminated stainless steel spoon or spatula.

Composite Sampling:

a. For Composite Sampling (applicable to non-VOC's only) where several discrete samples (of equal volume) are mixed together, collect the sample from 0-6 inches depth (or as specified by the project) from the first composite point. Cover the stainless steel bowl with aluminum foil and proceed to the next sampling point. Repeat between locations. If VOC samples are also being collected at each discrete point, the stainless steel spoon/trowel should be decontaminated between locations (Refer to Step 8). Once equal volumes of soil have been collected from each point which will make up the composite sample, the soil must be homogenized to create a representative sample. Prior to homogenization, twigs, roots, leaves, rocks, and miscellaneous debris should be removed from the sample using the stainless steel spoon or spatula. The soil should be mixed, quartered (divided into 4), and mixed again until a consistent physical appearance over the homogenized soil has been obtained. The soil should be transferred into the appropriate sample container using the stainless steel spoon or spatula.

4. Label the sample bottles (if the bottles are not pre-printed) with the sample location name, collection time, project name, analysis to be performed, and any other field required on the label.

5. Place the properly labeled sample bottles in a cooler with ice and maintain at 4ºC for the duration of the sampling and transportation period. Do not allow samples to freeze.

   Describe and record the following properties of the sample: basic soil type (e.g., sand, gravel, and clay), structure, texture, sorting, grain size, and grain shape, degree of saturation, color, odor, staining, and presence of foreign material. Refer to SOP#301, Field Description of Soils.

6. After sampling is completed, the sampling location should be marked by a wooden stake and flagging and/or wire flag. The station number and date of sampling should be written on the stake using a permanent marker or other waterproof ink. A properly calibrated GPS unit should be used to mark the sample location (Refer to SOP#107).

7. Decontaminate the sampling equipment as specified in SOP #501 and move to the next sampling location. Repeat steps 1 through 7 for subsequent sampling locations.

8. Soil samples should be packed and shipped/prepared for courier pick up according to SOP#607. The Chain of Custody (COC) document should be completed according to SOP#105.

SURFACE SOIL SAMPLING

D. QA/QC REQUIREMENTS:

When possible, the samples should be collected using the same type of equipment and in the same manner to ensure comparability of data. Field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation.

QA/QC samples should be collected following the same procedures as described above. The type and quantity of QA/QC samples is to be determined by the project scope, and in accordance with SOP# 605.

E. SPECIAL CONDITIONS:

If testing will be performed for metals, it must be recognized that metals can be present naturally and can be present from man-made sources. Moreover, different metals will be present in different concentrations depending on the soil type. Another class of compounds, polycyclic aromatic compounds, can be widely distributed in urban environments. To determine the natural concentrations of metals and PAHs in a particular area, it is important to collect background samples. At a minimum, one background sample should be collected from an area that is near the site, has similar soil types and similar topography. For some applications (e.g., human health risk assessment), it may be necessary to collect three background samples to provide sufficient statistical information.

F. REFERENCES:

New Jersey Department of Environmental Protection (August 2005), *Field Sampling Procedures Manual*, Chap. 6, retrieved January 5, 2009 from http://www.nj.gov/dep/srp/guidance/fspm/.

G. APPENDICES/FORMS:

Surface Soil Sampling Log

END OF SOP
Final Check by C. Burns 11/3/15

SMALL EQUIPMENT DECONTAMINATION

A. PURPOSE/SCOPE:

Proper decontamination of small equipment prevents cross-contamination of samples, introduction of contaminants to clean sites, and the mixture of incompatible substances. Equipment decontamination also assures the health and safety of all equipment users. Procedures for decontamination procedures vary depending on the matrix sampled, level of contamination, type of contaminants, and the target analytes of the sampling event. The procedure outlined in this SOP is a general procedure for field/ warehouse decontamination of equipment associated with water, soil and other surficial sampling activities.

Decontamination should be performed before sampling work commences and after each sampling event. Decontaminated equipment should be protected from contact with surroundings during storage and transport, and should be handled as little as possible before its use and always with disposable gloves. Note that all waste generated by decontamination procedures including liquids, solids, rags, gloves, etc., will be collected and disposed of properly according to the procedures outlined in SOP #507.

B. EQUIPMENT/MATERIALS:

- Alconox®
- Tap water
- Distilled and deionized water
- 10% Nitric acid rinse
- Acetone (or other pesticide grade organic solvent)
- 1-Gallon pressure spray bottles
- Long-handled brushes
- 5-Gallon plastic buckets

C. PROCEDURE:

Note that if it is logistically impractical/ impossible to complete all steps listed below at the field site, Steps 1-4 should be performed prior to transport of equipment to a facility where all steps can be completed if required. All field decontamination should take place over a container and liquids should be properly disposed of.

1. Disassemble equipment as necessary.
2. Remove gross contamination from equipment by scraping, brushing and rinsing with tap water
3. Wash with Alconox® or other laboratory grade detergent to remove all visible particulate matter and residual oils and grease.
4. Rinse with tap water to remove detergent.
5. Rinse with distilled and deionized water.
6. Field personnel will use a new pair of outer gloves before handling sample equipment after it is cleaned.
7. If equipment will not be used immediately, wrap in aluminum foil (unless sampling for metals analysis or PFAS sampling) or seal in plastic bags (unless sampling for organics analysis) and store.
    a. When sampling for PFAS refer to SOP #341 for procedures.
8. Record the date and method of decontamination on foil/bag and equipment log.

SMALL EQUIPMENT DECONTAMINATION

D. QA/QC REQUIREMENTS:

When necessary, field equipment rinsate blanks will be collected by pouring analyte-free water over decontaminated equipment and submitting them to the lab with the other blanks and samples. These blanks are used to assess the quality of equipment decontamination.

E. SPECIAL CONDITIONS:

Reusable PPE such as respirators, chemical-resistant overboots and gloves shall also undergo the equipment decontamination sequence. See SOP #505 for related information on Personnel decontamination.

If acetone is a known or expected contaminant another solvent may be substituted. Note that methanol cannot be used for decontamination when sampling gasoline or its by-products.

Additional decontamination procedures may be required for particular contaminants or when samples are to be analyzed at very low concentrations. Identify methods as needed but see for example Wilde, 2004.

F. REFERENCES:

New Jersey Department of Environmental Protection, August 2005. *Field Sampling Procedures Manual*.

USEPA, 1994. Sampling Equipment Decontamination. Environmental Response Team SOP #2006, Revision #0.0. Edison, NJ. http://www.ert.org.

USEPA, 1996. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Region 4, Science and Ecosystem Support Division. Athens, GA. http://www.epa.gov/region04/sesd/eisopqam/eisopqam.html

Wilde, F.D., ed., 2004. *Cleaning of Equipment for water sampling (ver. 2.0)*: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A3, April, accessed January 5, 2009 at http://pubs.water.usgs.gov/twri9A3/

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/27/15

DECONTAMINATION OF PERSONNEL

A. PURPOSE/SCOPE:

The objective of decontamination is to prevent the transmission of contaminants to personnel and equipment and to prevent the spread of contaminants off-site. Decontamination is performed as a quality assurance measure and as a safety precaution during sampling. The following SOP outlines general decontamination procedures that apply to personal protection Level C. Projects that necessitate higher levels of protection (Levels B or A) require site-specific decontamination plans as part of the project's Health and Safety Plan.

The decontamination area must be set up before any entry into contaminated areas or the Exclusion Zone. All personnel must undergo decontamination prior to leaving the site. Sites with relatively low contamination levels and no Exclusion Zone activities (Level D PPE) still may require decontamination. At Level D activity sites, decontamination should be provided for the following: washing of boots, or the removal and disposal of boot covers (booties); removal and disposal of disposable coveralls; removal and disposal of outer and inner gloves; and the washing of hands, arms and face prior to leaving the site, or taking any breaks for eating, drinking, etc.

B. EQUIPMENT/MATERIALS:

- Decontamination pad
- Brushes
- Polyethylene
- Tap water
- Detergent
- Appropriate decontamination solutions
- 55-Gallon drum
- Shallow wash buckets

C. PROCEDURE:

1. Maximum and minimum decontamination procedures for Level C protection are described in detail in Tables 1 and 2 on the following pages, and the procedure sequence is shown on associated flow-charts.
2. Arrange disposal of all waste generated during decontamination procedures according to guidelines in SOP #507. Check that all reusable PPE has been adequately decontaminated for future use.

D. QA/QC REQUIREMENTS:

Not Applicable

E. SPECIAL CONDITIONS:

Note that decontamination procedures will vary between sites depending on contaminants present.

DECONTAMINATION OF PERSONNEL

F. REFERENCES:

New Jersey Department of Environmental Protection *Field Sampling Procedures Manual*, August, 2005.

NIOSH, OSHA, USCG, EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, DHHS (NIOSH) Publication No. 85-115, October, 1985.

G. APPENDICES/FORMS:

Associated Flow Charts - The following Tables are included:

- Table 1. Maximum Measures for Level C Decontamination and Procedure Sequence
- Table 2. Minimum Measures for Level C Decontamination and Procedure Sequence

END OF SOP

Final Check by C. Burns 10/22/15

DECONTAMINATION OF PERSONNEL

Table 1. Maximum Measures for Level C Decontamination

Station	1:	Segregated Equipment Drop	1.	Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
Station	2:	Boot Cover and Glove Wash	2.	Scrub outer boot covers and gloves with decon solution or detergent and water.
Station	3:	Boot Cover and Glove Rinse	3.	Rinse off decon solution from station 2 using copious amounts of water.
Station	4:	Tape Removal	4.	Remove tape around boots and gloves and deposit in container with plastic liner.
Station	5:	Boot Cover Removal	5.	Remove boot covers and deposit in containers with plastic liner.
Station	6:	Outer Glove Removal	6.	Remove outer gloves and deposit in container with plastic liner.
Station	7:	Suit and Boot Wash	7.	Wash splash suit, gloves, and safety boots. Scrub with long-handle scrub brush and decon solution.
Station	8:	Suit and Boot, and Glove Rinse	8.	Rinse off decon solution using water. Repeat as many times as necessary.
Station	9:	Canister or Mask Change	9.	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, and joints taped worker returns to duty.
Station	10:	Safety Boot Removal	10.	Remove safety boots and deposit in container with plastic liner.
Station	11:	Splash Suit Removal	11.	With assistance of helper, remove splash suit. Deposit in container with plastic liner.
Station	12:	Inner Glove Rinse	12.	Wash inner gloves with decon solution.
Station	13:	Inner Glove Wash	13.	Rinse inner gloves with water.
Station	14:	Face Piece Removal	14.	Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.

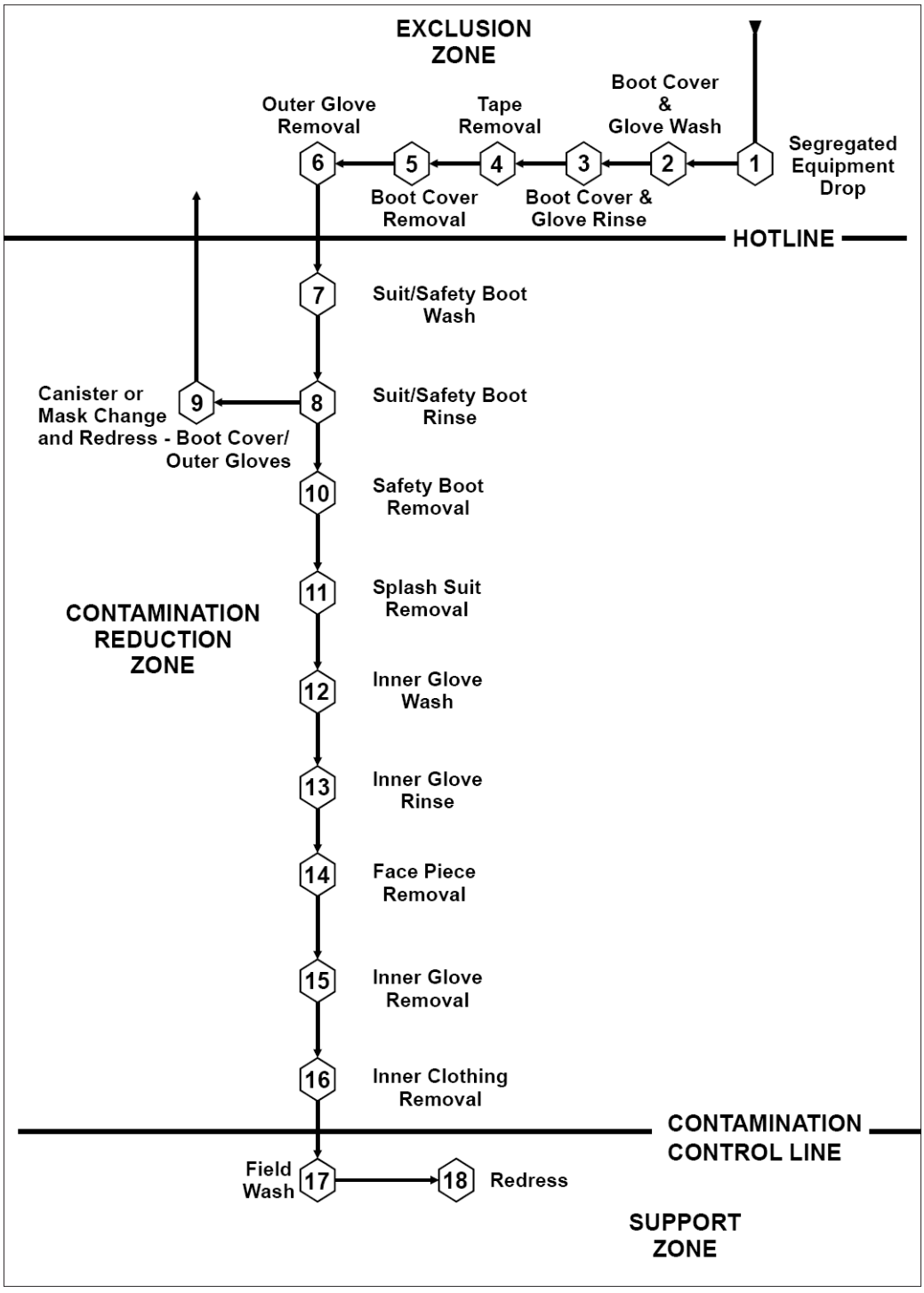
DECONTAMINATION OF PERSONNEL

Table 1. Maximum Measures for Level C Decontamination continued

Station	15:	Inner Glove Removal	15.	Remove inner glove and deposit in lined container.
Station	16:	Inner Clothing Removal	16.	Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulating suit.
Station	17:	Field Wash	17.	Shower if highly toxic, skin-corrosive or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Station	18:	Redress	18.	Put on clean clothes.

DECONTAMINATION OF PERSONNEL

Maximum Measures for Level C Decontamination



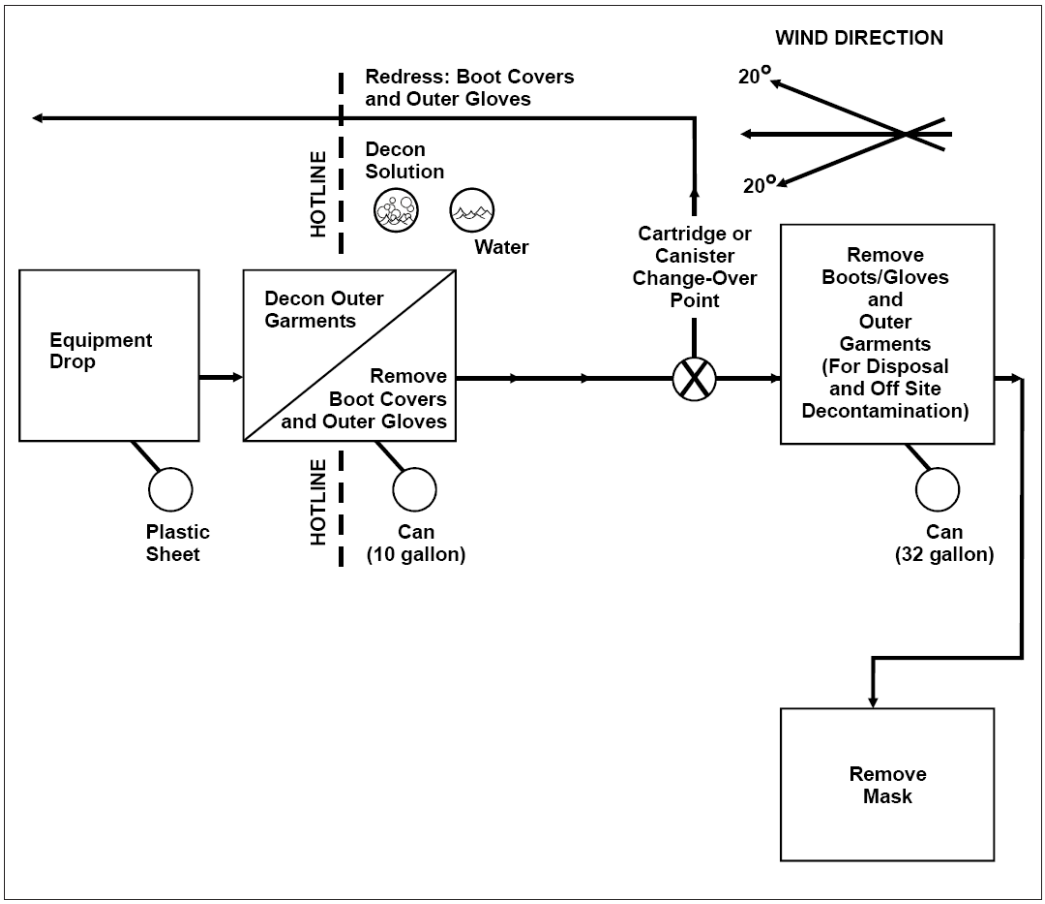
DECONTAMINATION OF PERSONNEL

Table 2. Minimum Measures for Level C Decontamination

Station	1:	Equipment Drop	1.	Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, a cool down station may be set up within this area.
Station	2:	Outer Garment, Boots, and Gloves Wash and Rinse	2.	Scrub outer boots, outer gloves and splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station	3:	Outer Boot and Glove Removal	3.	Remove outer boots and gloves. Deposit in container with plastic liner.
Station	4:	Canister or Mask Change	4.	If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station	5:	Boot, Gloves and Outer Garment Removal	5.	Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station	6:	Face Piece Removal	6.	Facepiece is removed. Avoid touching face with fingers. Facepiece deposited on plastic sheet.
Station	7:	Field Wash	7.	Hands and face are thoroughly washed. Shower as soon as possible.

DECONTAMINATION OF PERSONNEL

Minimum Measures for Level C Decontamination



Author: Meghan Platt, P.E.
Reviewer: Scott Smith, P.E.

RESIDUALS MANAGEMENT

A. PURPOSE/SCOPE:

The following standard operating procedure (SOP) presents a description of the methods generally employed for the management of residual waste. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable. In addition, field personnel are responsible for coordination efforts associated with the waste disposal facility, if known.

Improper handling and storage of residual waste can result in leaks and spills and pose a serious threat to the quality of the environment. Timely characterization and disposal of residual wastes shall be conducted in order to not exceed onsite quantity and/or storage regulations.

B. EQUIPMENT/MATERIALS:

Off-Site transportation and disposal of residual waste will be performed by a licensed waste hauler under the direction of CHA. The company will supply the necessary equipment and materials needed to remove the residual waste from the Site and transport it to an approved waste disposal facility.

The field geologist/engineer will obtain the necessary sample bottles with the associated preservatives, if required, from the analytical laboratory. See SOP #603, Sample Containers, Volumes, Preservations and Holding Times, for additional information on these topics. In addition, if a flame ionization detector (FID), photoionization detector (PID) and/or gas meter will be used to screen waste containers soils for the presence of volatile organic compounds (VOCs).

All other equipment required during transportation/disposal activities is the responsibility of the Contractor (waste hauler).

C. PROCEDURE:

1. During remedial activities all residual waste, including, but not limited to, soil cuttings, decontamination wash/rinse water, purge water and personal protective equipment (PPE) shall be containerized in United States Department of Transportation (USDOT) approved 55-gallon drums or similar waste containers, unless the Work Plan indicates otherwise. Each drum shall contain similar materials/matrices (e.g., soil, water, PPE).
2. Label each waste container using a permanent marker and weather proof label with the following:
    a. Description of the container contents
    b. Site name and address
    c. Name of Site contact and associated phone number

    Waste container labels shall be legible and easily understood by those unfamiliar with the Site.
3. Upon completion of remedial activities, the field geologist/engineer will conduct waste characterization of the residual waste prior to off-Site transportation and disposal. Depending upon the type of waste present, various waste disposal facilities may have different testing requirements. CHA will complete the required analytical testing. Upon receipt of analytical data and coordination with the disposal facility, the field geologist/engineer will supervise the removal of the waste from the Site.

RESIDUALS MANAGEMENT

4. Waste containers shall be transported and stored in a secure location on-Site. All waste containers shall be located in one location, if possible.
5. If waste containers are stored for a period of time prior to collecting waste characterization samples, all waste containers shall be inspected for signs of the potential presence of explosive/flammable gases and/or toxic vapors. These signs include pressurization (bulging/dimples); crystals formed around the drum opening; leaks, holes, stains; labels, marking; composition and type (steel/poly and open/bung); condition, age, rust; and sampling accessibility. Drums showing evidence of pressurization and crystals shall be further assessed to determine proper drum opening techniques.
6. All metal waste containers not in direct contact with the earth shall be grounded.
7. Open the waste container with spark resistant tools (e.g., brass, beryllium).
8. Screen the waste containers for explosive gases and/or toxic vapor with appropriate air monitoring instruments as necessary.
9. Obtain the necessary sample bottles with the associated preservatives, if required, from the analytical laboratory. See SOP #603, Sample Containers, Volumes, Preservations and Holding Times, for information regarding field preservation of sample containers, if necessary.
10. Each matrix (e.g., soil, water) shall be sampled for waste characterization purposes. The field geologist/engineer shall determine the quantity of similar waste characterization samples to be collected from the waste containers in conjunction with the project manager and/or waste disposal facility. Containers with similar wastes (e.g., soil, water) generated from one area of the site may require only one composite sample from each of the waste containers. This determination shall also be made in conjunction with the project manager and/or waste disposal facility.
11. Use a decontaminated spade or shovel to collect representative solid waste samples from each waste container or use a beaker, bailer or similar mechanism to collect representative liquid waste samples from each waste container.
12. Immediately place sample in the pre-preserved sample containers and close the waste container(s).
13. Chill all samples to 4^{o}C from sample collection until laboratory analysis.
14. Package and ship samples per SOP #607.

D. QA/QC REQUIREMENTS:

This section includes QA/QC requirements associated with tank closure activities. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.

RESIDUALS MANAGEMENT

E. SPECIAL CONDITIONS:

In no case, will CHA be considered the generator of the waste. The site owner shall always take responsibility for waste disposal. Additionally, CHA may only act as agent for the owner relative to signing manifests with specific permission from CHA's in-house counsel. In most every case, the owner should sign waste manifests.

F. REFERENCES:

United States Environmental Protection Agency, Science and Ecosystem Support Division, Waste Sampling Standard Operating Procedure: http://www.epa.gov/region4/sesd/fbqstp/Waste-Sampling.pdf

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/26/15

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

A. PURPOSE/SCOPE:

The following standard operating procedure (SOP) presents general guidelines for sample containers, volumes, preservations and holding times associated with air, water and soil/sediment samples. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable.

Improper preserving, storing and handling of air, water and soil/sediment samples are critical if the integrity of the samples are to be maintained. Samples collected in the field may undergo biological, chemical or physical changes following removal from their environment. In order to minimize those changes, many samples must have preservatives in the form of strong acids or bases added prior to delivery to the laboratory. If samples are to be collected as part of a government program, the governing agency typically must be notified 30 days prior to sample collection.

B. EQUIPMENT/MATERIALS:

Pre-cleaned sample containers along with associated preservations within the sample containers will be provided to CHA from the analytical laboratory. The field geologist/engineer will provide the necessary personal protective equipment to place samples collected within the appropriate sample containers per SOPs 300 through 417. However, if field preservation is required the following equipment and materials shall be obtained:

- Hydrochloric (HCl) Acid Reagent A.S.C. 38%
- Nitric (HNO3) Acid Reagent A.S.C. 71%
- Sodium Hydroxide (NaOH) 97%
- 10 mL glass pipettes
- Narrow range (0-3 and 12-14) pH paper
- Nitrile gloves

C. PROCEDURE:

1. Review Table 1 which details typical parameters of interest at environmental sites and the associated methods, preservation, container type, holding time and required sample volume.
2. Obtain pre-cleaned and pre-preserved sample containers from the laboratory. If pre-preserved sample containers were provided skip to Step 7; if not proceed to Step 3.
3. Put on a clean pair of nitrile gloves.
4. In a clean, non-dusty environment, remove the cap of the sample container.
5. Using a clean, 10 mL glass pipette draw the required amount of acid or base and insert into the sample container.
6. Volatile Organic Compounds – 2 mL of HCl acid (water samples).
7. Total and Dissolved Metals (including mercury) – 5 mL Nitric acid (water samples).
8. Cyanide – 15-20 Sodium Hydroxide pellets (water samples).

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

9. Chemical Oxygen Demand, Oil and Grease, Organic Carbon, Phenolics, Total Dissolved Phosphorous, Hydrolyzable Phosphorus, Ammonia, Nitrate and Nitrite – 5 mL Sulfuric acid (water samples).
10. Immediately replace and tighten the sample container cap.
11. Collect sample using equipment and procedures outlined in other SOPs as appropriate. The volume of the sample collected shall be sufficient to conduct the analysis required, as well as associated quality assurance/quality control samples (QA/QC). QA/QC samples shall be collected in accordance with SOP 605.
12. Place samples immediately in the pre-preserved sample containers.
13. Chill all samples to 4°C from sample collection until laboratory analysis.
14. Package and ship samples per SOP #607.

D. QA/QC REQUIREMENTS:

This section includes QA/QC requirements associated with sample containers, volumes, preservations, and holding times. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.
4. QA/QC samples shall be collected in accordance with SOP 605.

The following procedure shall be conducted to provide a QA/QC check of water (aqueous) samples to ensure the samples were preserved to the proper pH prior to shipping for laboratory analysis.

Volatile Organic Compounds:

1. Collect one additional VOA vial at every third aqueous sampling location.
2. Fill the extra vial with the sample.
3. Using the extra VOA vial, remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of water.
4. Place two drops of the water on a 1-inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add additional HCL to the remaining 3 VOA vials prior to collecting the sample.
7. Discard the vial used to check the pH.

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

Total and Dissolved Metals, Mercury, Ammonia, Nitrate plus Nitrite, Total Dissolved Phosphorus, COD, Oil & Grease, Organic Carbon, Phenolics

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle to mix the acid and water.
3. Remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1 inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add appropriate additional Sulfuric Acid to the sample using a clean pipette.
7. Recheck sample using steps 2 through 6 until sample pH is less than 2.

Cyanide

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle until the NaOH pellets are dissolved.
3. Remove the cap and using a clean 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1-inch strip of 12-14 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not greater than 12, add additional NaOH to the sample using standard procedures.
7. Recheck sample using steps 2 through 6 until sample pH is greater than 12.

E. SPECIAL CONDITIONS:

Not Applicable

F. REFERENCES:

Alpha Analytical Aqueous and Soil/Solid Reference Guides.

G. APPENDICES/FORMS:

Table 1 Laboratory Analysis: Summarizing parameters, methods, preservations, container type, holding times and minimum sample volumes are included as an attachment to this SOP.

END OF SOP

Final Check by C. Burns 10/27/15

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
WATER						
Acid Soluble & Insoluble Sulfide	-----	9030B	Cool to 4 deg C No Headspace	P or G	7 Days	8 oz.
Acidity as CaCO3	305.1	2310B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity	-----	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity as CaCO3	310.1	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Ammonia	350.2/.3	4500-NH3 B,E	Cool to 4 deg C, H2SO4 to pH<2	P or G	28 Days	400 mL
Aromatic Hydrocarbons	602	8021B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon- faced silicone septum	14 Days	40 mL
Biochemical Oxygen Demand	405.1	5210B	Cool to 4 deg C	P or G	48 Hrs.	500 mL
Bromide	300	-----	None	P or G	28 Days	250 mL
Calcium	-----	3120B	HNO3 to pH<2	P or G	6 Months	100 mL
Calcium- Hardness	200.7	3111B	HNO3 to pH<2	P or G	6 Months	100 mL
Carbamates	531.1	-----	Cool to 4 deg C, 0.08% Na2S2O3 if residual chlorine present	G, screw cap Teflon faced silicone septum	14 Days	100 mL mL
Carbonaceous BOD	-----	5210B	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Chloride	300	4500-CL D 4110	Cool to 4 deg C	P or G	28 Days	100 mL
Chloride, Residual Disinfectant	-----	4500Cl-G	Cool to 4 deg C	P or G	Analyze Immediately	200 mL
COD	410.4	5220D	H2S04 to pH<2, Cool to 4 deg C	P	28 days	250 mL
Color	-----	2120B	Cool to 4 deg C	P or G	24 Hrs	100 mL
Conductivity	-----	2510B	Cool to 4 deg C	P or G	28 Days	100 mL
Cyanide	335.4	4500-CN C&E	Cool to 4 deg C NaOH pH>12	P or G	14 Days	250 mL
Cyanide	335.2	9010B, 9012A, 9014	Cool to 4 deg C, NaOH to pH>12 0.6 g ascorbic acid if residual chlorine present	P or G	Sulfide absent, 14 days; sulfide present 24 Hrs	250 mL
Cyanide, Amenable	335.1					
Dioxin	-----	8280A	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
DRO	-----	8015B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Escherichia Coli	-----	9222B	0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Extractable Org. Compounds			Cool to 4 deg C, Store in dark	G, Amber Teflon-lined screw cap	*7 days	4000 mL

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Fecal Coliform	-----	9222B or D	0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fecal Streptococci	-----	9230C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fluoride	300	4500 F-B,C S	Cool to 4 deg C	P or G	28 Days	300 mL
Foaming Agents (MBAS)	-----	5540C	Cool to 4 deg C	P or G	48 Hrs	250 mL
Gases	-----	3810	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present 1:1 HCl to pH <2	G, Vial screw cap with center hole Teflon- faced silicone septum	7 days without HCl 14 days with HCl	40 mL
GRO	-----	8015B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon- faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL
Hardness			HNO3 to pH<2	P	6 months	1000 mL
Heterotrophic Plate Count	-----	9215B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Hexavalent Chromium	7196A	3500Cr-D	Cool to 4 deg C	P	24 hours	500 mL
HPLC (Explosive)	------	8330	Cool to 4 deg C	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000mL
HPLC (Explosive)	------	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap		1000mL
Mercury	-----	7470A	Cool to 4 deg C	P or G	28 Days	8 oz.
Metals	200.7	-----	HNO3 to pH<2	P	6 Months	100 mL
Nitrate	300	-----	Cool to 4 deg C	P or G	48 Hrs.	100 mL
Nitrate (Chlorinated)	353.2	4500-NO3 F	Cool to 4 deg C	P or G	48 Hrs	250 mL
Nitrate (Non- chlorinated)	353.2	4500-NO3 F	H2SO4 to pH<2, Cool to 4 deg C	P or G	14 Days	250 mL
Nitrite	300, 353.2, 354.1	4500-NO3 D	Cool to 4 deg C	P or G	48 Hrs	100 mL
Odor	-----	2150B	Cool to 4 deg C	G only	24 Hrs	200 mL
Oil and Grease		1664	HCl to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	1000 mL
Organic Nitrogen	351.1	-----	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Organochlorine Pesticides/PCB	608	8081A,8082	Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present If aldrin is to be determined bind to pH 5-9.	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Ortho Phosphate	300	4500 P-E	Cool to 4 deg C	P or G	48 Hrs	50 mL
Orthophosphate	365.2	-----	Filter immediately, Cool to 4 deg C	P or G	48 Hrs.	50 mL
PFAS/PFCs (see Note 11)	1633A		Cool to 4 deg C	P - HDPE only with no teflon liner	28 Days	2(250 mL)
pH, Hydrogen ion	-----	4500-H-B	Cool to 4 deg C	P or G	Analyze Immediately	25 mL
Phenols	420.1	9065, 510ABC	Cool to 4 deg C, H_2SO_4 to pH<2	G	28 Days	500 mL
Pseudomanas Aeruginosa	-----	9213E	Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Purgeable Halocarbons	601	8021B	Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present	G, Vial screw cap with center hole Teflon- faced silicone septum	14 Days	40 mL
Radiological	-----	-----	HNO_3 to pH<2	P or G	6 Months	100 mL
Residue- Settleable (SS)	160.5	-----	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Residue-filtered (TDS)	160.1	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-non- filtered (TSS)	160.2	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-Total Volatile Solids	160.4	2540 E	Cool to 4 deg C	P or G	7 Days	100 mL
Salinity	-----	2520 C	Cool to 4 deg C	G	28 Days	100 mL
Semivolatile Organic Compounds (Unregulated)	525.2	-----	If residual chlorine is present, add 40-50 mg Sodium Thiosulfate. If not chlorinated, add 6N HCl to pH<2 Cool to 4 deg C	G, Amber Teflon-lined screw cap	7 Days for extraction, 30 after extraction	1000 mL
Semivolatile Organics	625	8270C	Cool to 4 deg C 0.008% $Na_2S_2O_3$ if residual chlorine present	G, Amber Teflon-lined screw cap	7 days for extraction 40 days after extraction	1000 mL
Silica	200.7	-----	Cool to 4 deg C	P only	7 Days	50 mL
Specific Conductance	120.1	-----	Cool to 4 deg C	P or G	28 Days	100 mL
Sulfate	300	4500-SO_4	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfate	375.4	-----	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfide	376.2	9030 B, 4500S2-AD	Cool to 4 deg C, add zinc plus NaOH to pH>9	P or G	7 Days	50 mL
Sulfite (SO_3)	377.1	-----	None Required	G, Bottle and Top	Analyze immediately	50 mL
Surfactants (MBAS)	425.1	-----	Cool to 4 deg C	P or G	48 Hrs.	250 mL
TDS			Cool to 4 deg C	P	7 days	500 mL

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Temperature	-----	2550B	None	P or G	Analyze Immediately	1000 mL
Temperature	170.1	-----	None Required	G, Bottle and Top	Analyze immediately	1000 mL
Total Kjeldahl Nitrogen	353.3/.1	4500Norg-C	H2S04 to pH<2 , Cool to 4 deg C	P	28 days	250 mL
Total Coliform	-----	9221D	0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Total Dissolved Solids	160.1	2540C	Cool to 4 deg C	P or G	7 Days	100 mL
Total Hardness	130.2 , 200.7	-----	HNO3 to pH<2 H2SO4 to pH<2	P or G	6 Months	100 mL
Total Kjeldahl Nitrogen	351.3	-----	H2SO4 to pH<2	P or G	28 Days	500 mL
Total Metals	200.7 200.8	6010B, 6020, 7000A	HNO3 to pH<2	P	6 months (Hg 28 days)	500 mL
Total Organic Carbon (TOC)	415.1	9060, 5310C	H2SO4 to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	80 mL
Total Organic Halides		5320B	1N H2SO4 to pH<2	P or G	28 Days	50 mL
Total Phosphorus	365.2	-----	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	50 mL
Total Recoverable Oil & Grease	413.1,166 4A	-----	Cool to 4 deg C, HCL or H2SO4 to pH<2	G	Petroleum Based 3 Days; Non-Petroleum Based 24 hours	1000 mL
Total-Residue (TS)	160.3	2540B	Cool to 4 deg C	P or G	7 Days	100 mL
Turbidity	180.1	2130B	Cool to 4 deg C	P or G	48 Hrs	100 mL
Volatile Organics	624	8260B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL
Volatiles (Regulated)	524.2	-----	Cool to 4 deg C HCl to pH<2	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	60-120 mL
SOIL						
Acid Soluble & Insoluble Sulfide	-----	9030B	Cool to 4 deg C, no headspace	P or G	7 Days	8 oz.
Amenable Cyanide	-----	9213	Cool to 4 deg C	P or G	14 Days	4 oz.
Bromide	-----	9211	Cool to 4 deg C	P or G	28 Days	8 oz.
Cation - Exchange Capacity	-----	9080, 9081	None	P	-----	8 oz.
Chloride	-----	9212, 9056, 9253	None	P or G	28 Days	8 oz.
Chlorinated Herbicides	-----	8151A	Cool to 4 deg C	G, wide mouth, teflon liner	14 Days	8 oz.
Corrosivity pH Waste>20% water	-----	9040B	Cool to 4 deg C	P	Analyze Immediately	4 oz.
Corrosivity Toward Steel	-----	1110	Cool to 4 deg C	P	14 Days	4 oz.

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Cyanide		9010B, 4500CN	Cool to 4 deg C	G, Amber	14 Days	4 oz
Dioxin	-----	8280A	Cool to 4 deg C	G	14 Days	8 oz.
DRO	-----	8015B	Cool to 4 deg C	G, Amber	14 Days	4 oz.
Extractable Organic Compounds			Cool to 4 deg C, Store in dark	G	14 days	8 oz
Extractable Sulfide	-----	9031	Cool to 4 deg C, fill top of sample with 2N Zinc Acetate until moistened	P or G	7 Days	8 oz.
Fluoride	-----	9214	None	P	28 Days	8 oz.
Gases	-----	3810	Cool to 4 deg C	G, Amber	14 Days	8 oz.
Grain Size			N/A	G	N/A	8 oz
GRO	-----	8015B	Cool to 4 deg C, check state regulations for proper preservative. NJ (methanol), PA (encore samplers) NY (cool to 4 deg C).	G, Amber VOA vial	14 Days	15 Grams
HPLC (PAH)	------	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 days until extraction 40 days after extraction	4 oz.
Ignitability	-----	1010	None	P or G	None	8 oz.
Ignitability of Solids		1030	None	P or G	None	8 oz.
Mercury	245.1	7471A	Cool to 4 deg C	G, Amber	28 Days	4 oz.
Metals	-----	6010B, 6020, 7000A	Cool to 4 deg C	G, Amber	6 Months	8 oz.
Moisture Content			Store in airtight jar 3-30 deg C	G	N/A	8 oz
Nitrate	-----	9210	Cool to 4 deg C	P or G	48 Hrs	8 oz.
Oil & Grease (Sludge, Sludge- Hem)	-----	9071B	Cool to 4 deg C	G	28 Days	8 oz.
Organochlorine	-----	8081A	Cool to 4 deg C	P or G	14 Days	8 oz.
Paint Filter Liquids Test	-----	9095A	Cool to 4 deg C	P or G	-----	8 oz.
PCBs	-----	8082	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 Days	4 oz.
PFAS/PFCs (see Note 11)	1633A	-----	Cool to 4 deg C	HDPE w/o lined cap	28 days	8 oz.
pH	-----	9045C	Cool to 4 deg C	G, Amber	Analyze Immediately	4 oz.
pH, Soil and Waste	-----	9045A	Cool to 4 deg C	G	Analyze Immediately	8 oz.
Phenol	-----	9065, 9066, 9067	Cool to 4 deg C	G, Amber	28 Days	4 oz.
Radiological	-----	-----	Cool to 4 deg C	G	6 Months	8 oz.
Reactivity Cyanide	-----	SW-846 7.3.3.2	Cool to 4 deg C	P	14 Days	8 oz.
Reactivity Sulfide	-----	SW-846 7.3.4.2	Cool to 4 deg C	P	14 Days	8 oz.
Semivolatile Organics	-----	8270C	Cool to 4 deg C	G, Amber	14 Days	8 oz.
Sulfate	-----	9035, 9036, 9038	Cool to 4 deg C	P or G	28 Days	8 oz.

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Sulfides	-----	9215	Cool to 4 deg C	P or G	7 Days	8 oz.
TCLP Metals	-----	1311, 6010B, 6020, 7000A, 7470A	Cool to 4 deg C	G, Amber	180 Days (Hg 28 days)	8 oz
TCLP Herbicides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Pesticides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Semivolatile Organics	-----	1311, 8270C, 8081A, 8151A	Cool to 4 deg C	G, Amber Teflon Lined	14 Days	8 oz.
TCLP Volatile Organics	-----	1311, 8260B	Cool to 4 deg C	G, Amber VOA Vial Teflon Lined	14 Days	8 oz.
Temperature	-----	2550	-----	P	Analyze Immediately	4 oz.
TOC		Lloyd Kahn Method	Cool to 4 deg C	G, Amber	14 days	4 oz.
Total Coliform	-----	9131	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Coliform	-----	9132	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Cyanide	-----	9013	Cool to 4 deg C	P or G	14 Days	8 oz.
Volatile Organic Compounds	-----	8260B	Cool to 4 deg C Check individual state regulations for proper preservative. NJ (methanol), PA (encore samplers), NY (cool to 4 deg C)	G, wide mouth, teflon liner	14 Days	4 oz.
Volatile Organic Compounds	-----	8021		G, wide mouth, teflon liner	14 Days	4 oz.
CLP Sampling and Holding Time Information						
Cyanide (aqueous)	ILM04.1		NaOH to pH>12, Cool to 4 deg C	P	12 Days VTSR	1000ml
Cyanide**	ILM04.1		Cool to 4 deg C	G		8 oz
Mercury (aqueous)	ILM04.1		HNO3 to pH<2, Cool to 4 deg C	P	26 Days VTSR	1000ml
Mercury (solid/soils)	ILM04.1		Cool to 4 deg C	G		8 oz
Metals (aqueous)	ILM04.1		HNO3 to pH<2, Cool to 4 deg C	P	180 Days VTSR	1000ml
Metals (solid/soils)	ILM04.1		Cool to 4 deg C	G		8 oz
PCBs (aqueous)	OLM04.2		Na2S203, Cool to 4 deg C	G	See Note 7	1000ml
PCBs (solid/soils)	OLM04.2		Cool to 4 deg C	G	See Note 6	8 oz
Pesticides (aqueous)	OLM04.2		Na2S203, Cool to 4 deg C	G	See Note 7	1000ml
Pesticides (solid/soils)	OLM04.2		Cool to 4 deg C	G	See Note 6	8 oz
Semivolatile Organic Compounds (aqueous)	OMLO4.2		Cool to 4 deg C	G	See Note 8	1000ml
Semivolatile Organic Compounds (solid/soils)	OLM04.2		Cool to 4 deg C	G	See Note 6	8 oz
Volatile Organic Compounds (aqueous)	OLM04.2		HCL pH < 2, Cool to 4 deg C	G	W/preservative: 10 days VTSR; W/O: 7 days VTSR	40ml
Volatile Organic Compounds (solid/soils)	OLM04.2		Cool to 4 deg C	G	10 Days VTSR	4 oz

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume

Notes:

1. P - Plastic.
2. G - Glass.
3. Minimum volume is the minimum volume required by the laboratory to conduct the analysis. The laboratory will likely require additional sample volume.
4. * Extraction within seven (7) days of collection; analysis within 40 days of extraction.
5. **When chlorine is present ascorbic acid is used to remove the interference (0.6 g ascorbic acid).
6. VTSR - Validated time of sample receipt.
7. Ten (10) days from VTSR for extraction and 40 days following extraction.
8. Five (5) days from VTSR for extration 14 days after extraction.
9. Five (5) days from VTSR for extraction 40 days after extraction.
10. Holding times are from the time of sample collection unless otherwise noted.
11. PFAS analysis should follow method 1633A and/or current NYSDEC recommended or required method and guidance.

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

A. PURPOSE/SCOPE:

This standard operating procedure explains the purpose and correct usage of Quality Assurance/Quality Control (QA/QC) samples. QA/QC samples are intended to validate the results of sample analysis by providing the means to determine the influence of outside factors on the sample and analysis. There are several types of QA/QC samples in use to ensure the best practices are being followed by both the laboratory preforming the analysis and the sampling team in the field. This is a general procedure for the use of QA/QC samples. Also refer to any guidelines provided by the laboratory.

B. EQUIPMENT/MATERIALS:

QA/QC samples require the following materials:

- Sample containers:
  They should be the same containers in number and type of preservative as the containers for the samples for which QA/QC samples are being taken.
- Analyte-free water
- Any laboratory supplied QA/QC materials.

C. PROCEDURE:

The following are types of QA/QC samples.

1. Duplicate Sample

A duplicate sample is a sample that is collected concurrently with the routine samples. It consists of an additional set of sample containers to be analyzed for the same parameters as the routine samples. It is taken at a sample point of the samplers choosing and at the same time as the routine sample for that sample point is taken. It is labeled and included on the Chain of Custody (COC) Form (see SOP 105) with a name unknown to the laboratory.

Example:

- Sample Point ID is **MW-1**
- Duplicate Sample ID is **CHA-1**

The duplicate sample is submitted as a 'blind' sample to the laboratory. The purpose of a duplicate sample is to allow the sampler to determine the precision of laboratory analysis. The results of the duplicate sample are compared with the results of the concurrent routine sample by the sampler. These results should be within the margin of error for the test being performed.

One duplicate sample should be taken for every twenty (20) routine samples. For example if 16 samples points were sampled, there would be 1 duplicate sample taken at one of the sample points for a total of 17 sample sets submitted to the lab.

2. Field Blank

The Field Blank sample is a type of QA/QC sample used to account for possible external contamination of the routine samples, usually by exposure to the air from being on site. It consists of an additional set of sample containers to be analyzed for the same parameters as the routine samples. It is common to only conduct a Field Blank for volatile organic compound (VOC) parameters even when sampling

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

to additional parameters. This is because VOCs are more likely to be present in the atmosphere at the site thaen a parameter like metals. However a Field Blank can be conducted for any parameter.

The containers are prepared prior to sampling by filling the containers with analyte-free water. The containers are then transported with the routine sample containers to the site. Once at the site the containers are placed in a location representative of the site conditions and their caps are removed. At the end of the sampling event the caps are then replaced. The sample is labeled and included on the COC as **Field Blank** or **FB**.

If any results are positive for the Field Blank it can be assumed that the routine samples have also been exposed to a similar amount of contaminant and that contaminant is probably present in the atmosphere at the site.

One Field Blank should be taken as required for each day of sampling at the site. They are only used for the collection of aqueous samples.

3. Equipment Blank

An Equipment Blank is a QA/QC sample designed to measure the effectiveness of the decontamination of field equipment. It consists of an additional set of sample containers being analyzed for the same parameters as the routine samples.

An Equipment Blank is collected by pouring analyte-free water directly over/on/into the decontaminated sampling equipment coming into contact with the samples being collected. The water is then collected in the sample containers. Once the containers are filled they are capped and sent to the lab with the other routine samples. The sample is labeled and included on the COC as **Equipment Blank** or **EQ Blank**.

A positive result for the analysis of the Equipment Blank could signal inadequate decontamination of the equipment which may result in cross-contaminated samples and thus suspect results.

One Equipment Blank should be taken for every twenty (20) routine samples collected. The Equipment Blank is not necessary when using dedicated sampling equipment or sampling equipment that is disposed of between each sample point.

4. Matrix Spike/Matrix Spike Duplicate Sample

The Matrix Spike/Matrix Spike Duplicate (MS/MSD) Sample is a quality control system used by the laboratory to check the accuracy of their instruments. It consists of a set of two (2) samples taken at a sample point concurrently with the routine sample for a total of three (3) sets of containers for that sample point. Therefore, the MS/MSD samples should be collected from sample points with sufficient sample volume (e.g., monitoring wells that have low recharge are not good candidates). They are labeled and included on the COC as 'Sample ID' MS and 'Sample ID MSD'.

Example:

- Sample Point ID is **MW-1**
- Matrix Spike would be **MW-1 MS**
- Matrix Spike Duplicate would be **MW-1 MSD**

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

The MS/MSD samples are submitted to the laboratory with the routine samples. Once at the laboratory they will have a known amount of an analyte added, known as the spike. The sample will then be run as a routine sample. Once the results are received they are compared to the results of the routine sample (MW-1 results are compared to MW-1 MS results). There should be a difference in the amount of analyte detected between the samples that should be within the margin of error of the amount of analyte spike that was added to the MS sample. This process is repeated for the MSD sample. This process is an internal review of results for the laboratory to determine the accuracy of their instruments.

One MS/MSD set should be taken for every twenty (20) samples (including Duplicate Samples and Field or Equipment Blank Samples). For example if 12 samples are taken, there should also be a set of MS/MSD samples taken for a total of 14 sample sets submitted to the lab. If 20 samples will be taken, only one set of MS/MSD samples needs to be submitted (total number of samples being 22).

The following QA/QC samples are used for only specific analyses or functions.

5. Trip Blank

A Trip Blank is a form of QA/QC that is utilized to account for possible exposure to an external source of VOCs during storage and transport of the sample containers and samples to and from the laboratory. It consists of a VOC sample container prepared by the laboratory and filled with analyte-free water. Trip Blanks are only required when aqueous samples are being collected for VOC analysis, all other parameters do not need one.

The Trip Blank is placed in the cooler with the sample containers when they are sent form the lab to the client. The Trip Blanks will remain in the cooler with the sample containers at all times. When the samples are collected they are placed in the cooler and put on ice with the Trip Blanks for shipment to the lab. At no time should the Trip Blanks be opened or removed from the coolers containing VOC samples. The Trip Blank should be labeled and included on the COC as **Trip Blank** or **TB**.

Each cooler that contains samples for VOC analysis must have a Trip Blank. It is good practice to combine all VOC containers from a site into one cooler to minimize the number of Trip Blanks required. For example if there are five coolers of samples, place all the VOC containers into one cooler and the remaining containers in the other four coolers. Thus only the VOC cooler requires a Trip Blank, which saves on the cost of analysis.

A positive result on the Trip Blank for a VOC could indicate the samples had been exposed during transportation which can have an effect on the results of the routine samples.

Different laboratories have different practices concerning their Trip Blanks. For example some laboratories will include just one VOA vial as their trip blank while others will utilize multiple vials for theirs. The extra vials are often included only as a backup in the event one of the Trip Blank vials is broken during transport, and will not be analyzed unless necessary.

D. QA/QC REQUIREMENTS:

Not Applicable

QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

E. SPECIAL CONDITIONS:

Temperature Blanks are a type of QA/QC that fall outside of the umbrella of QA/QC Samples.

A Temperature Blank is a container provided by the lab and is used to obtain the temperature of the cooler upon receipt at the lab, usually with an infrared thermometer. It is generally a ~125 mL plastic bottle filled with tap water.

- The Temperature Blank should be left in the cooler during sampling. When the cooler is being prepared for shipment, place the Temperature Blank in the center of the cooler next to the sample containers. There is no need to open the container; it is filled with tap water and therefore harmless unless otherwise noted on the container.
- It should be noted that not all laboratories require a Temperature Blank. There is no cost associated with the Temperature Blanks in the coolers.

F. REFERENCES:

United States Environmental Protection Agency (July 2007), *Samplers Guide, Contract Laboratory Program Guidance for Field Samplers*, Section 3.4, retrieved April 6, 2009, from http://www.epa.gov/superfund/programs/clp/download/sampler/clp_sampler_guidance.pdf

United States Environmental Protection Agency (May 2002), *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers*, Page 34, retrieved December 15, 2010, from http://www.epa.gov/tio/tsp/download/gw_sampling_guide.pdf

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

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FIELD HANDLING, PACKAGING, AND SHIPPING

A. PURPOSE/SCOPE:

This procedure describes proper methods for the handling, packaging, and shipping of samples from the field to the laboratory. When preparing samples for transportation to the laboratory it is important to maintain the integrity of the samples in order to obtain the most accurate results possible and to prevent possible contamination of other samples or the package itself. These procedures generally apply to samples collected in the field, any state or federal regulations or guidelines applying to the shipment of hazardous samples must be followed. In addition any guidelines provided by the laboratory should be consulted.

These procedures refer to the shipment of soil, sediment or water samples. For the shipment of air canisters refer to section J: Special Conditions.

B. EQUIPMENT/MATERIALS:

The following materials are required to adequately package samples

- Appropriately sized coolers that can accommodate samples and ice
- Plastic bags (i.e. garbage bags) large enough to contain all samples and ice
- Zip lock bags
- Ice sufficient to keep samples cool. DO NOT USE DRY ICE
- Bubble wrap or similar padding material
- Bubble bags or a similar padding material for any glassware
- Packing tape. Do not use duct tape inside coolers as it can contain volatile chemicals which could contaminate samples
- Custody seals and/or tamper-evident tape
- Appropriate labels (including 'UP' Arrows, Ice labels, Regulatory Compliance Labels (49 CFR 173.4), Shipping bills/labels).

C. PROCEDURE:

Once the samples have been collected, properly labeled and documented (See SOP's #103 and #105) the following steps should be followed to pack and ship the samples.

For aqueous, sediment, soil or other solid samples:

1. Prepare the cooler for shipment
    - Seal and/or plug the cooler drain if present.
    - Place a layer of bubble wrap or other cushioning material on the bottom of the cooler.
    - Use a large plastic bag (liner) to line the cooler. It should fill the cooler with little void space between bag and cooler walls, if not use a smaller cooler or additional cushioning material. Double bag the cooler if using thin plastic bags. Place a thin layer of ice in the bottom of the liner.
2. Prepare the sample containers
    - Ensure all caps and lids are securely attached.
    - Check that all labels have been properly filled out and attached
    - Check that the samples are properly noted on the Chain-of-Custody (COC) and on any applicable field sheets.
    - Place sample containers into zip lock bags if they are being used.

FIELD HANDLING, PACKAGING, AND SHIPPING

3. If the sample is in a glass container place that container in a bubble bag or other cushioning material (bubble wrap roll, foam block, etc.) and secure it with tape. Try to avoid having glass in direct contact with ice as this can lead to the glass breaking (because the ice does melt).
4. Place samples in the cooler inside the liner.
    - All containers should be upright in cooler inside the bag liners.
    - Try to place glass containers towards the middle of the cooler.
    - Do not overfill the cooler. Try to keep weight below 60 lbs. to allow for easier maneuvering of the cooler.
    - Add a Trip Blank and a Temperature Blank if required. Include the Trip Blank on the COC. Place the Temperature Blank in the center of the cooler.
5. Add more ice, making sure that all containers are covered. The samples should arrive at the laboratory at 4° Celsius (+/- 2° C).
6. When all samples are in the cooler, or the cooler is full, gather the bags and tie or twist the loose ends to contain the ice and samples. Use packing tape, and a Custody seal if desired, to seal the bag liner.
7. Place another layer of bubble wrap or cushioning material on top of the bag for further protection and insulation of the samples. Make sure any void space in the cooler is filled to prevent the samples from shifting during transportation.
8. Put the COC along with any other required documentation inside a sealed zip lock bag and place it in the cooler.
9. Seal the cooler.
    - Place a signed and dated Custody seal on the cooler (if being used). The seal should extend from the top of the cooler, across the seam between the lid and the front, and down the front of the cooler. Tape over the custody seal using a length of tape continuously around the cooler. The seal should be placed such that it will be broken if the cooler is opened.
    - Using packing tape, tape around the cooler from front to back crossing both the top and the bottom of the cooler, use a continuous length of tape to help maintain integrity. Tape the cooler in at least two locations (i.e. left and right sides to create two bands of tape encircling the cooler.)
10. Place all required labels on the cooler. These can include ‘UP’ directional arrows, Wet Ice labels and regulatory labels (49 CFR 173.4). Tape them down as needed.
11. Fill out and affix the necessary shipping labels to the lid of the cooler.
12. All samples should be shipped overnight to the laboratory.
13. Alert the laboratory that the samples are en route. This is especially important for samples being delivered on a Saturday or around a holiday as the laboratory may be closed or have different hours. It is good practice to coordinate with the lab ahead of sampling to determine when the lab will receive samples.

FIELD HANDLING, PACKAGING, AND SHIPPING

For air samples:

1. Remove any regulators or valves from the canister.
2. Replace the canister and associated equipment in the container they were received in.
3. Place the COC in a zip lock bag with any required documentation and seal the bag. Put the COC into the container.
4. Add any necessary padding materials to fill void space and ensure the canister is protected and cannot shift during transport.
5. Seal the cooler with Custody Seals and packing tape.
6. Affix the necessary labels and shipping bills to the container.
7. Alert the laboratory that the samples are en route.

D. QA/QC REQUIREMENTS:

If aqueous samples for Volatile Organic Compound (VOC) analysis are being shipped use a Trip Blank (See SOP#605).

Some laboratories require Temperature Blanks (See SOP# 605) in each cooler of samples.

E. SPECIAL CONDITIONS:

These procedures apply to environmental samples only. An environmental sample usually consists of possibly contaminated water, soil, or sediment or air to be analyzed. In order to comply with regulations (ex. 49 CFR 173), no more the 30 mL of a product may be shipped in any one container inside the cooler (For example you can ship 3 containers with 20 mL of an oil to be tested, but not 2 containers with 40 mL of oil in them). Consult state and federal regulatory agencies and the laboratory receiving the samples if you are unsure of the regulations on the samples being taken.

F. REFERENCES:

United States Environmental Protection Agency (June 2010), *Sample Collection Information Document*, Section 5, retrieved August 31, 2012 from http://www.epa.gov/sam/sample_collection_information_document_SAM_companion.pdf

United States Environmental Protection Agency (July 2007), *Samplers Guide, Contract Laboratory Program Guidance for Field Samplers*, Section 3.4, retrieved April 6, 2009 from http://www.epa.gov/superfund/programs/clp/download/sampler/clp_sampler_guidance.pdf

Tennessee Valley Authority, *Standard Operating Procedure For: Sample Labeling, Packing, and Shipping* (July 2010), retrieved August 31, 2012 from http://www.tva.gov/kingston/sap/

G. APPENDICIES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/27/15

REMEDIAL CONSTRUCTION OVERSIGHT AND DOCUMENTATION

A. PURPOSE/SCOPE:

This SOP is intended to provide guidance and define the responsibility of CHA personnel engaged in construction observation. The objective of construction observation is to document construction activities for compliance with the contract requirements. Since the duty of CHA personnel on-site will vary based on our contractual obligations to our client, size and complexity of the project, project specification requirements and types of activities being observed, performance of the contractor, etc., it is important that the observer be familiar with:

- CHA's contract with the client
- The contract/agreement between the contractor and client
- Project manual/specifications and drawings
- Project plans and/or work plans
- Site-specific HASP.

Note: *Construction "observation" or "oversight" refers to the action or process of observing something or someone in order to gain information without the higher level of completeness and rigor implied by the term "inspect". The term "inspect" implies a rigorous and complete review of construction relative to what is shown in the contract documents. The industry generally interprets the term "inspector" to imply that this employee has some authority over the contractor to control conformance with plans and specifications. With the exception of work performed under CHATS, CHA typically has no contractual relationship with the contractor performing the work or authority over the contractor, and thus, it is important to refer to our construction phase oversight as "observation" rather than "inspection."*

B. EQUIPMENT/MATERIALS:

Required Equipment:

- Personal protective equipment (PPE) – Level D at a minimum
- Clothing appropriate for weather anticipated
- Field book
- Indelible pens & markers (e.g. Sharpies) – unless sampling for PFAS. See SOP #341 for PFAS sampling permitted materials.
- Clipboard (preferably one that encloses paperwork)
- Field/Construction Observation Reports
- Digital camera
- 25-foot steel measuring tape (preferably in 100ths)

Optional Equipment (based upon project-specific needs):

- Additional PPE (Level C, personal flotation devices, etc.) – Refer to site-specific HASP
- 100', 200', or 300' measuring tapes or measuring wheel
- 6' folding wood ruler (preferably in 100ths)
- Hand held GPS
- Photoionization detector, combustible gas meter, particulate meter, etc.
- Latex/nitrile gloves

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- Sampling equipment and containers
- Wooden survey stakes and 3-lb. sledge hammer
- Survey tape/flagging/wire stakes
- Survey tape
- Digital audio recorder
- Computer with remote network access (for long duration projects).

C. GENERAL PROCEDURES/JOB DUTIES:

Electronic File Storage: Wherever practical, the below referenced documentation should be stored electronically and routinely uploaded to the project folders on CHA's server. Binders may be used to store paper documentation when appropriate, but CHA personnel should make a reasonable effort to minimize the amount of paper generated for the project and the amount of files stored at the site due to the potential for damage or loss of such documents.

The CHA construction observer will perform the following tasks:

1. Attend a preconstruction meeting whenever possible. If possible, a field visit to the project site should also be made.
2. Establish and maintain lines of communication between all parties. Establish a chain of command with the CHA PM, the client, the contractor, regulators, etc.
3. File all correspondence in the project folder, including e-mails. Letters received in hard copy only should be scanned in PDF format and stored in the project file as well. All correspondence should be stored with the date first followed by a description of the content to facilitate future searches (e.g. 2015-01-01_CHA to Contractor Re Recent Analytical Results). Conversation Logs and Meeting minutes shall be stored in a similar manner.
4. Monitor that construction work conforms to the provisions of the contract documents and/or project plans (i.e. HASP, QAPP, CAMP, SWPPP, etc.).
5. Prepare daily observation reports and take digital photographs documenting major site activities and observations made. For small, simple projects, complete a **Field Observation Report**. For larger, more complex projects where multiple activities are being observed, a more detailed **Construction Observation Report** should be completed. At a minimum, observation reports will include:

   - Date and weather conditions
   - Name of important visitors
   - Work/activity in progress and location
   - Contractor's means and methods for completing activities
   - Size of contractor's work force and equipment in use
   - Number of hours worked per day for contractor and subcontractor (arrival & departure times)
   - The substance of important conversations with the contractor concerning conduct, progress, changes, test results, interpretations of specifications and all other important details
   - Reporting of any variances made in the field to sampling plans, SOPs or other applicable contract documents
   - Documentation of calibration/maintenance of field instrumentation, field screening

REMEDIAL CONSTRUCTION OVERSIGHT AND DOCUMENTATION

observations, samples collected, etc.

6. Maintain digital photographic documentation of all work completed. Sufficient photographs should be taken to depict the location of the activity, the material(s) being placed/installed, the equipment being utilized by the contractor, the means and methods implemented by the contractor, and any issues that may arise.
7. Observe all materials incorporated in the work for compliance with the contract documents and inform the Engineer and contractor of any conflicts.
8. Attend regularly scheduled progress meetings, as appropriate. Prepare meeting minutes and submit to engineer/PM for review. Upon completing any modifications, distribute meeting minutes to the project team.
9. Review project schedules to prepare for upcoming work and anticipate changes or potential conflicts.
10. Computations will be made of quantities of work performed, and materials used on the project by actual field measurements and survey data provided by the Contractor in accordance with the specifications.
11. Track, collect and review all required shop drawings and submittals. Forward to design engineers for review when necessary. Advise the Engineer and Contractor of the commencement of any work requiring a Shop Drawing or sample if the submittal has not been approved by the Engineer.
12. Oversee testing and observation requirements called for in the contract documents. Document that testing required by the contract documents is performed and that commercially manufactured products used on the project are accompanied by numerical test results or a certification from the manufacturer that the material meets applicable standards. QA/QC testing will be provided through the contractor as part of the technical specifications. The contractor will be required to prepare and submit all documentation of both failed and passed QA/QC tests.
13. Review test reports and certifications for conformance with the contract documents. Each test report for material in place should, as a minimum, contain the following:
    - Test performed and dated
    - Applicable standard or project specifications
    - Test location
    - Test result
    - Action taken on failing tests.
14. Maintain a file of all test reports and certifications as provided by the contractor.
15. Inform the contractor in writing, of deficiencies in order that the corrections can be made and retested prior to covering any substandard work with additional material. Document that corrective work and retesting is performed.
16. Coordinate with the contractor the preparation of record or as-built drawings and remind the contractor periodically to collect important record data as the work progresses, particularly for work that will be covered by subsequent tasks.

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D. QA/QC REQUIREMENTS:

It is important to read all contract documents and project plans and maintain an understanding of which QA/QC testing will be the responsibility of the contractor versus CHA throughout the duration of the project. QA/QC testing performed by CHA employees (e.g. end point sampling, air monitoring, etc.) shall be completed in accordance with CHA's SOPs. QA/QC testing requirements listed in the project specifications are typically required to be performed by the Contractor and it is often the responsibility of the contractor to retain an independent third party testing agency to meet these testing requirements.

It should be noted that prequalification testing refers to testing results that must be provided to the Engineer for acceptance prior to commencing with a task utilizing the specified material. Conformance testing or field QA/QC testing typically refers to post-installation or placement testing that is completed on-site after the specified material is installed.

E. SPECIAL CONDITIONS:

The field observer must be in frequent communication with the CHA Project Manager or task manager regarding the progress of the project. Circumstances can change quickly on projects and proactive communication can help reduce the potential for larger problems or issues to arise. Depending on the situation, it may become important to record additional information. Examples may include:

1. Detail breakdown of type and number of personnel on-site for each contractor/subcontractor and hours worked by each.
2. Detailed breakdown of heavy equipment on-site and hours each piece of equipment is actually used each day.
3. Material deliveries and quantities.
4. Delays and/or downtime (length of time, people affected, equipment not used, etc.).
5. Detailed weather information (e.g. periodic wind speed and direction throughout day).
6. Length of time spent in upgraded levels of PPE and number of personnel working in exclusion zones.
7. Air monitoring results, dust control issues, air monitoring plan exceedances, etc.
8. Details for erosion and sediment control issues (e.g. tracking onto roadways).
9. Detailed lists of all site visitors (sign in/sign out sheets).

F. REFERENCES:

CHA Total Technical Quality Control Manual, Field Observations Section: http://chanet.cha-llp.com/manual/ttqc/section7/index.cfm

G. APPENDICES/FORMS:

Field Observation Report – for simple, short duration projects.

Construction Observation Report – for complex, longer duration projects.

END OF SOP
Final Check by C. Burns 11/19/2015

APPENDIX C

Community Air Monitoring Program

Community Air Monitoring Plan

Appendix C –Excavation Work Plan
Sterling Drug Site #1
Curia New York, Inc. Facility
Rensselaer, New York

The following Community Air Monitoring Plan (CAMP) will be implemented during intrusive excavation activities performed at the Curia New York, Inc. (Curia) facility located at 33 Riverside Avenue in Rensselaer, New York in accordance with the Excavation Work Plan (EWP).

Air monitoring will be conducted in accordance with the New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan.* Air monitoring will be conducted on a real-time basis, using both hand-held field instruments and perimeter air monitoring stations, for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area.

- Continuous monitoring will be performed during ground intrusive activities including excavation of exterior soils for slab foundations, utility trenching, and any other subsurface excavation work completed outside buildings.
- Continuous monitoring will be performed during excavated soil handling/load-out activities
- Data will be recorded electronically by the monitoring units and will be downloaded from the CAMP air monitoring stations onto a flash drive or laptop and field logged daily.
- CAMP data records will be maintained on-site for New York State Department of Environmental Conservation (NYSDEC) and NYSDOH review. Monitoring readings for volatiles and dust will be recorded in a logbook and/or recorded by data loggers and will be provided to NYSDEC and NYSDOH (along with a sketch identifying the locations of the CAMP measurements/instrumentation coinciding with the CAMP data set) on a weekly basis, at a minimum, while ground-intrusive and soil handling activities are taking place.
- All CAMP monitoring records will also be submitted as part of the Project Report.

This CAMP is not intended for use in establishing action levels for worker respiratory protection that shall be described in the Site-specific HASP prepared by the Contractor for the proposed intrusive activities. Rather, its intent is to provide a measure of protection for the downwind community (i.e. off-Site receptors including residences and businesses, and facility workers not directly involved with the excavation activities) from potential airborne contaminant releases as a direct result of intrusive excavation activities. Reliance on this CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this CAMP will help prevent the excavation activities from spreading contamination on-site and off-Site through the air.

Particulate Monitoring, Response Levels, and Actions

Particulate monitoring must be employed during outside ground intrusive activities associated with excavation/exposition of subsurface soils. CAMP monitoring will not be considered

necessary for indoor activities, unless odors and/or dust generation is noted outside of the building due to the project work being performed.

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations (one placed upwind and one placed downwind). The particulate monitoring will 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 will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

1. Reasonable fugitive dust suppression techniques must be employed during all Site activities which may generate fugitive dust. Fugitive dust is expected to be minimal.
2. Particulate monitoring must be employed during: the handling of contaminated soil.
3. Particulate monitoring will be performed using real-time particulate monitors and will monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:
   a. Objects to be measured: Dust, mists or aerosols;
   b. Measurement Ranges: 0.001 to 400 milligrams per cubic meter (mg/m^3) or 1 to 400,000 micrograms per cubic meter ($\mu g/m^3$);
   c. Precision (2-sigma) at constant temperature: +/- 10 grams per cubic meter (g/m^3) for one second averaging; and +/- 1.5 g/m^3 for sixty second averaging;
   d. Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mass median diameter (mmd)= 2 to 3; g-2.5, as aerosolized);
   e. Resolution: 0.1% of reading or $1g/m^3$, whichever is larger;
   f. Particle Size Range of Maximum Response: <0.1 to 10 microns (µm);
   g. Total Number of Data Points in Memory: 10,000 or greater;
   h. Logged Data: Each data point with average concentration, time/date and data point number
   i. Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), short-term exposure limit (STEL) concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
   j. Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required. Personnel conducting air monitoring must be immediately notified of any alarms by remote sensors, text messaging, or other similar equipment. Utilizing periodic checks of instrumentation in alarm mode only is not acceptable monitoring practice.
   k. Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
   l. Operating Temperature: 0 to 50 ˚C (14 to 122 ˚F); and
   m. Operating Humidity: 10 to 99 percent Relative Humidity.
4. Particulate levels will be monitored immediately downwind at the intrusive activities and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task.
5. The action level will be established at 150 $\mu g/m^3$ (15 minutes average). While conservative, this short-term interval will provide a real-time assessment of on-Site air quality to assure both health and safety. If particulate levels are detected in excess of 150 $\mu g/m^3$, the upwind background level must be confirmed immediately. If the working Site

particulate measurement is greater than 100 µg/m³ above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect Site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-Site personnel and implementing additional dust suppression techniques. Should the action level of 150 µg/m³ continue to be exceeded work must stop and Project Managers from Curia, CHA, and NYSDEC must be notified. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. Methodologies (e.g., wet drilling methods) will be employed during intrusive Site work to minimize the generation of dust. However, it must be recognized that the generation of dust from contaminated soil that migrates off-Site, has the potential for transporting contaminants off-Site. There may be situations when dust is being generated and leaving the Site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-Site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working Site, additional dust suppression techniques will be employed.

The following techniques have been shown to be effective for the controlling of the generation and migration of dust during investigation activities:

- Wetting equipment and exposed soil faces;
- Covering soil cuttings with polyethylene sheeting or drumming soil cuttings in 55-gallon drums with lids.
- Moving soil in properly tarped or watertight containers; and
- Restricting vehicle speeds to 10 mph.

When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort, activities excavation and/or soil handling may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect Site personnel and the public. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

VOC Monitoring, Response Levels, and Actions

VOCs will be monitored at one upwind and one downwind location adjacent to the ground intrusive and/or outdoor soil handling work area. VOCs will be monitored on a continuous basis, concurrently with fugitive dust monitoring. The monitoring work should be performed using a 11.7 electron volt (eV) PID. 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. The compiled data from all intrusive excavation activities will be provided within the final summary report at the end of the project.

APPENDIX D

SPER CBS Checklist

ANNUAL CBS TANK INSPECTION CHECKLIST

CBS Registration No. 4-000043
PBS Registration No. 4-600745

ORGANICHEM
33 Riverside Avenue
Rensselaer, NY 12144

Date Performed:_____

The annual inspection applies to the following tanks; (circle appropriate tank)

02	03	04	05	06	07	08		011	012	014
019	021	WW05	WW06	99T10	19T01	20T01	20T02	20T03	20T04	20T05
16T02	16T01	031	99T17	99T18						

PBS Tank #					
O15	016	57T01	99T09		

Annual	Inspector's Initials
1. Perform annual visual inspection of storage tank, piping & pumping system for cracks, areas of wear, corrosion, poor maintenance and operating practices, excessive settlement of structures, separation or swelling of tank insulation	
• Visual inspection for malfunctioning equipment, looseness or inadequate pipe supports and pipe fasteners, paint deterioration.	
• Visual inspection of dikes / secondary containment systems for erosion, cracks, evidence of a release, settlement, structural weakness.	
• Visual check of coatings, corrosion protection systems, welds, rivets, foundations, spill control equipment, emergency response equipment, fire-extinguishing equipment.	
• Visual check of equipment, structures, and foundations for excessive wear or damage.	
2. Check to ensure that drain valves are closed (if not in use) and there are no unpermitted discharges of contaminated water or other hazardous substance.	

I certify that I have performed the above referenced inspection of the CBS Tanks Referred to on this form.

INSPECTOR'S NAME	DATE	INSPECTOR'S SIGNATURE

DEFICIENCIES OR COMMENTS

Revised

APPENDIX E

Summary of Green Remediation Metrics for Site Management Form

Form A
Summary of Green Remediation Metrics

Site Name: _____ Site Code: _____ Operable Unit: _____
Address: _____ City: _____
State: _____ Zip: _____ County: _____

Reporting Period
Contract Period From: _____To: _____
Reporting Period From: _____To: _____ Is this a Final Report? Yes ☐ No ☐

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____ Company Code: _____
Contract No. _____

Materials & Waste Generation: Quantify the materials used or consumed and the management of waste generated on-site.

	Current Reporting Period (Include Units)	Total to Date (Include Units)
Materials Brought to the Site		
• Topsoil		
• Fill		
• Silt Fence		
• Silt Logs		
• Aggregate Base Course		
• Geotextile		
• Solidification Additives		
• Activated carbon		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
Total Wastes Generated On-Site		
• Remedy Generated Waste		
• Contractor Generated Waste		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		

Provide a description of any implemented waste reduction programs appropriate for this project in the space provided on the certification page.

Recycled and Bio-Based Content in Imported Products and Materials: Quantify all materials and products imported to the site, including cost of materials/dollar values. Provide total percentages of recycled and bio-based of products and materials.

List Products and Materials Below	Total $ Value Provided	Total Percent of Recycled Content	Total Percent of Bio-based Content

Provide additional descriptions, as necessary, in the space provided on certification page.

Solid Waste Disposal and Diversion: Quantify all solid wastes generated, and indicate whether material was disposed or diverted for recycling or reuse.

Solid Waste Material	Date	Disposed or Diverted	Volume (Ton or CY)	Disposal/Recycling Facility Name	Comments (if not diverted, state why)
TSCA Contaminated Sediment					
Non-TSCA Contaminated Sediment					
Cleared Vegetation					
Spent Granular Activated Carbon					
Monitoring Well Removal Debris					
Other:					
Other:					
Other:					
Other:					
Other:					
Other:					

Provide descriptions in the space provided on the certification page of all wastes that were redirected for recycling or reuse. Indicate full names and addresses of facilities.

Energy Usage: Quantify the amount of energy used on-site and portion of that voluntarily derived from renewable energy sources.

	Current Reporting Period (KWh)	Total to Date (KWh)
Total electricity usage		
Of that total amount, provide quantity:		
• Derived from renewable source (i.e., solar, wind)		
• Other:		

Provide descriptions in the space provided on the certification page of all reported energy use reduction programs appropriate to this project, including use of electricity derived from renewable sources.

Water Usage: Quantify the volume of water used on-site from difference sources.

	Current Reporting Period (Gallons)	Total to Date (Gallons)
Total quantity of water used on-site		
Of that total amount, provide the quantity obtained from:		
• Public potable water supply		
• Surface water		
• On-site treated groundwater		
• Reclaimed treated water		
• Collected or diverted storm water		
• Re-Injected groundwater		
• Other:		
• Other:		

Provide descriptions in the space provided on the certification page of any reported water use reduction programs applied. Please note if reused/injected groundwater is pre-treated.

Emissions: Quantify the distance traveled for delivery of supplies and removal of waste.

	Current Reporting Period (Miles)	Total to Date (Miles)
Off-site mobile fuel combustion		
Other:		

Provide descriptions in the space provided on the certification page of practices such as use of local vendors within 150 miles of the site and on-site stationary fuel use reduction programs.

Quantify the number of hours that diesel and other equipment with the potential to emit hazardous air pollutants (HAPs) or greenhouse gas (GHG) emissions was operated on-site.

	Current Reporting Period (Hours)	Total to Date (Hours)
On-site diesel excavation/construction equipment usage		
Other on-site processes generating emissions		
Other:		

Quantify the VOC emissions from active remediation systems on-site.

	Current Reporting Period (lbs VOCs emitted)	Total to Date (lbs VOCs emitted)
Operating soil remediation equipment		
Operating groundwater remediation equipment		
Other:		

Provide descriptions in the space provided on the certification page of the type of equipment used, rating, emission control devices used and other means to reduce emissions.

Land and Ecosystem: Quantify the amount of land and/or ecosystems disturbed by construction and the area of land and/or ecosystems restored to a natural condition.

	Current Reporting Period (Acres)	Total to Date (Acres)
Total land area disturbed		
Total land area restored		
Increase in area for storm water infiltration (vs pre-disturbed conditions)		
Increase in area of native species plantings (vs pre-disturbed conditions)		
Other:		

Quantify the amount of land and/or ecosystems remediated.

	Current Reporting Period (Acres)	Total to Date (Acres)
Total area of land impacted by contamination		
Total area of land remediated to unrestricted use		
Total area of land remediated to other future site use		

Additional Comments on Green Remediation Programs Implemented: *Provide descriptions in the space provided of other green remediation practices performed during the project.*

Descriptions of green remediation programs reported above (Attach additional sheet if needed)
Materials and Products Imported:
Waste Generation:

Descriptions of green remediation programs reported above (Attach additional sheet if needed)
Recycled and Bio-Based Content in Imported Products and Materials:
Solid Waste Disposal and Diversion:
Energy Use:
Water Use:
Emissions:
Land and Ecosystem:
Other:

CERTIFICATION BY CONTRACTOR
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including the last day of the period covered by this application. _____ _____ **Date** **Contractor**

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